Province of British Columbia
Ministry of Energy, Mines and
Petroleum Resources
Hon. Jack Davis, Minister

BRITISH COLUMBIA MINERAL EXPLORATION REVIEW 1986

Frontispiece. View of the Blackdome gold mine, looking southwesterly.

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Petroleum Resources

MINERAL RESOURCES DIVISION
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BRITISH COLUMBIA MINERAL EXPLORATION REVIEW 1986

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INTRODUCTION

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INTRODUCTION

The pace of mineral exploration quickened in British Columbia in 1986. A combination of exploration successes, attractive new exploration targets, flow-through shares, and a government exploration incentive program (FAME), contributed to a higher level of exploration activity. Although the number of mineral claims recorded by year-end is estimated to be only in the neighbourhood of 55 000, as compared to 59 116 recorded in 1985, expenditures for mineral exploration are expected to reach $90 to $95 million, as compared to $80 million spent in 1985 (Figure 1). Many properties acquired during the intensive staking of 1983 have now reached the advanced exploration stage and major underground programs were implemented on 10 gold prospects during 1986.

EXPLORATION EXPENDITURES AND
NUMBER OF MINERAL CLAIMS RECORDED
1973-1986

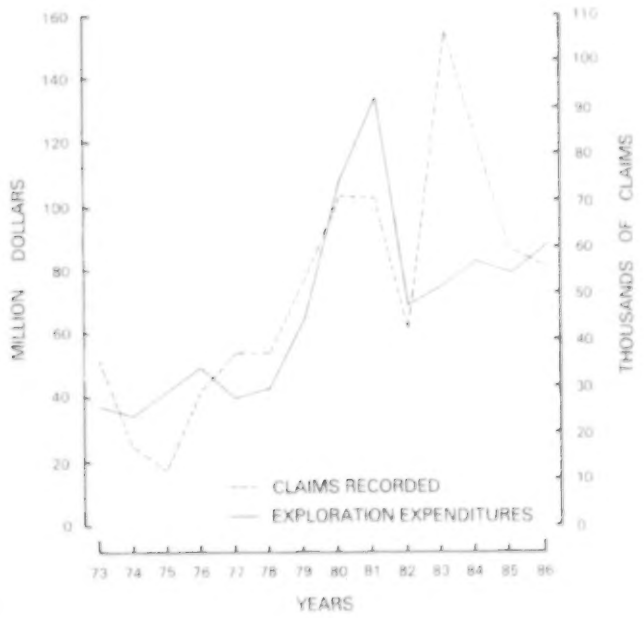
MILLION DOLLARS
THOUSANDS OF CLAIMS
CLAIMS RECORDED
EXPLORATION EXPENDITURES
YEARS
73 74 75 76 77 78 79 80 81 82 83 84 85 86

Figure 1. Mineral exploration expenditures and number of claims recorded, 1973-1986.

A new gold producer, the Blackdome mine (69)*, commenced operations in May 1986, and by year's end was paying dividends and rapidly approaching full payback on capital investment. A new mine is under construction on the Hedley gold-skarn deposit of Mascot Gold Mines Limited with production expected to start in April 1987. The Lawyers epithermal gold-silver deposit of Serem Inc. is poised for development.

Three porphyry mines, Brenda, Bell and Endako reopened, partly as a result of government initiatives. In addition Gibraltar Mines Limited commissioned a leaching facility and electrowin plant to treat low-grade stockpile and waste dump material. The first electrowon copper was produced on October 7. Cominco Ltd. and Lornex Mining Corporation Ltd. combined their operations in the Highland Valley to create one of the free world's largest producers of copper concentrate. A new company, Highland Valley Copper Ltd., was formed and an $83 million project to increase the capacity of the Valley mine to 120 000 tonnes/day was announced.

EXPLORATION HIGHLIGHTS

As in 1985, precious metals continued to be the main exploration target throughout the province, with the search focusing on six principal deposit types. A summary of exploration highlights by deposit type is given below, followed by more detailed district reports by each of the seven District Geologists.

EPITHERMAL PRECIOUS METAL DEPOSITS

Epithermal gold-silver deposits, by far the most popular target, were sought throughout the province, with particular emphasis in the northwestern district.

One of the busiest areas continued to be the Toodoggone camp, 300 kilometres north of Smithers, where gold-silver mineralization occurs along the axis of a major belt of early Jurassic subaerial volcanic rocks. The deposits are structurally controlled and characterized by propylite, clay and silica alteration typical of epithermal systems.

The Lawyers deposit (36) of Serem Inc. has been extensively explored in recent years and a production decision is pending. Reserves are reported to be approximately one million tonnes grading 7.2 grams gold and 260 grams silver per tonne. Mineralization occurs mostly in spectacular amethyst-gold breccia veins and replacements along faults and shears.

In the Albert's Hump area, Energex Minerals Ltd. spent in excess of $2 million on continued exploration of the BV, Bonanza Ridge, Thesis II and Thesis III zones. Work included more than 3000 metres of diamond drilling and the operation of pilot mill, with a 6-tonne daily capacity, which processed material averaging 58.7 grams/tonne gold.

*The location of each property referred to in the Introduction and District Geologists' reports is shown, by map number, in Figures 2 and 3. Summary descriptions of all properties are presented in Tables 1 and 2, listed sequentially by map number.

One of the most significant developments in the Toodoggone camp is the discovery of a strong and well-mineralized vein system in the vicinity of the former Baker mine (37) by Multinational Resources Inc. There are indications that this may well be the extension of the vein previously mined by Du Pont of Canada Exploration Ltd. Additional drilling and underground development are already scheduled for 1987 on this property.

North
~~South~~west of Stewart, the Newhawk Gold Mines Ltd./Lacana Mining Corporation joint venture completed a $1.5 million surface and underground drilling program on its Sulphurets property (21) where gold-silver mineralization occurs in structurally controlled epithermal veins associated with extensive quartz-carbonate alteration. Closer to Stewart, Westmin Resources Limited continued its evaluation of the Big Missouri (24) and Silbak Premier (27) properties with major surface and underground drilling programs.

In the Cassiar camp, Erickson Gold Mining Corp. conducted an aggressive program on the Vollaug vein where new ore reserves have been established in three zones, and on the Cusac option where six previously unknown gold-bearing veins have been discovered.

In the Dome Mountain gold camp (43), Teeshin Resources Ltd./ Canadian United Minerals Inc. are considering further surface and underground drilling on the Boulder Creek and Forks zones, where mineral inventories are reported at 218 000 tonnes grading 15.7 grams gold and 79.5 grams silver per tonne and 90 000 tonnes grading 19 grams gold per tonne respectively.

Southwest of Williams Lake, production at the Blackdome mine (69) began in May at the nominal rate of 180 tonnes per day with start-up reserves of 185 000 tonnes grading 24.7 grams gold and 117.5 grams silver per tonne. Bonanza-type gold mineralization occurs in several strongly developed and continuous high-level epithermal veins cutting felsic to intermediate Eocene subaerial flows and pyroclastic rocks.

Intensive exploration for epithermal and mesothermal gold-bearing veins continues in the Bridge River gold camp. Work by Levon Resources Inc. on the Congress property (114) included diamond drilling, trenching and a decline on the Howard zone to provide better definition of drill-indicated mineralization.

On Vancouver Island, Better Resources Ltd. carried out an extensive diamond-drilling program on its Mount Washington property, including late-season drilling on the Domineer and Murex zones.

A major drill program was started on the Babe property (199) of Consolidated Cinola Mines Ltd. on the Queen Charlotte Islands, following the purchase of a controlling interest in the company by City Resources (Asia) Ltd.

VOLCANOGENIC MASSIVE SULPHIDE DEPOSITS

A second important target is volcanogenic polymetallic massive sulphide mineralization with precious metal values. The commissioning of the H-W mine and mill on Vancouver Island by Westmin Resources Limited, at a cost of $250 million, sparked a major exploration effort in Sicker Group rocks in 1985. Abermin Corporation continued exploration on its Lara property (161) near Chemainus and discovered very high-grade massive sulphide mineralization by surface trenching on the Coronation zone.

Near Adams Lake, Corporation Falconbridge Copper continued drilling at the HN-AR deposit (125), under option from Rea Gold Corporation. Drilling on the Silver zone, discovered late in 1985, outlined extensive stratabound mineralization which is reported by Rea to include 1.02 million tonnes grading 1.4 grams gold and 727.5 grams silver per tonne, 2.89 per cent zinc, 3.20 per cent lead and 1.16 per cent copper. Drilling on the Discovery zone by Rea Gold increased the mineral inventory in the L-97, 98 and 100 lenses to a reported 242 870 tonnes grading 6.5 grams gold and 73.3 grams silver per tonne, 2.25 per cent zinc, 2.14 per cent lead and 0.53 per cent copper. This baritic polymetallic deposit, and the similar Kamad deposit (126) being explored by Esso Minerals Canada, occur in intermediate to felsic Devono-Mississippian metavolcanic rocks of the Eagle Bay Formation.

In the Iskut River area, Skyline Explorations Ltd. proceeded with a significant underground program on its Reg property, to gain access for underground sampling and drilling on the Cloutier vein system.

GOLD-BEARING SKARNS

The economic importance of gold-bearing skarns has been re-emphasized by Mascot Gold Mines Limited's decision to bring its Nickel Plate mine into production. Gold at Nickel Plate occurs with arsenopyrite and skarn alteration in Upper Triassic sedimentary and volcanic rocks intruded by Jurassic diorites. Pittable reserves at this major deposit are reported at 6.4 million tonnes grading 5.14 grams/tonne gold with a 8.2:1 stripping ratio and a cutoff grade of 1.56 grams/tonne. An additional 2.4 million tonnes grading 5 grams/tonne gold is reported as underground reserves. This famous old property will enter its third generation of production since the turn of the century when the new mine opens in mid-1987.

In the Slocan camp, Esperanza Explorations Ltd. completed a surface and underground drilling and development program on the Tillicum Mountain deposit and shipped 3420 tonnes of ore averaging 27 grams/tonne gold for custom milling.

REPLACEMENT DEPOSITS ASSOCIATED WITH LISTWANITES

The significance of this fourth precious metals target is emphasized by the Golden Bear deposit (8) in the Tatsamenie Lake area.

North American Metals B.C. Inc., working under an option agreement with Chevron Minerals Ltd., tested the Bear zone underground for a strike length of 350 metres and reports that results of this program should improve the reserves of 1.146 million tonnes averaging 10.6 grams/tonne gold estimated by Chevron.

PORPHYRY GOLD DEPOSITS

Deposits of this type offer possibilities for bulk mining and continue to attract considerable interest throughout the province.

In the Quesnel Lake area Dome Exploration (Canada) Ltd. completed two substantial drill programs on its QR deposit (63). Gold occurs in intensely propylitized Upper Triassic volcanic rocks cut by a coeval and probably comagmatic differentiated high-level alkalic stock.

Trader Resources Corp. continued evaluation of its Yellow Giant property (30) on Banks Island where at least 10 separate gold occurrences are present in faulted panels of deformed and metamorphosed Paleozoic calcareous sediments cut by fractured granitic rocks.

In the Slocan, Northair Mines Ltd. carried out a major two-stage underground exploration program on the Willa property (95) where gold is found in silicified porphyries and highly propylitized, probably coeval volcanic rocks and intrusive breccias of the Lower Jurassic Rossland Group.

In the Harrison Lake area, Kerr Addison Mines Limited continued drilling on the RN property (195). Gold occurs in quartz veins cutting Tertiary quartz diorite. Late-season drilling may be followed by underground exploration.

MANTO DEPOSITS

High-grade silver-lead-zinc replacement deposits, that have been compared by some to the Mexican manto deposits, have also been a target. The Midway deposit (9) consists of laterally continuous pipes of replacement mineralization along the contact between Devonian carbonate rocks and an overlying shale sequence. Grades average 18 per cent combined lead and zinc and 530 grams/tonne silver.

INDUSTRIAL MINERALS

On the industrial minerals scene, Cominco Ltd. conducted a major exploration program on the Aley niobium-bearing carbonatite deposit (68) east of Williston Lake. Cassiar Mining Corporation spent in excess of $4 million on underground exploration of its McDame deposit (11) which is estimated to contain 62 million tonnes of high-grade asbestos ore. In the extreme northwest corner of the province, Queenstake Resources Ltd. entered into a joint venture with Haines Gypsum Inc. to explore the O'Connor Gypsum deposit (2). Drill-indicated reserves are 25 million tonnes of high-grade gypsum suitable for wallboard applications.

COAL

In coal exploration, Gulf Canada Resources Ltd. carried out extensive drilling and surface surveys on the Klappan anthracite deposits (54). A second adit was completed and a 40 000-tonne trial shipment was made through Stewart to the South Korean market. This large project is poised for development.

The articles which follow are arranged by activity in each of the seven District Geologist's areas. Separate sections are devoted to industrial minerals exploration, field activities by staff of the British Columbia Geological Survey Branch, and to the FAME program of Financial Assistance to the Mineral Industry. Information on mineral exploration programs was supplied to the District Geologists either directly or through press releases by the many exploration companies active throughout the province. Mineral claims and exploration expenditure statistics were supplied by the Ministry's Titles Branch and by the British Columbia and Yukon Chamber of Mines. Input was by Debbie Bulinckx, formatting by Rosalyn Moir and draughting by Martin Taylor. Editing and coordination was by J.M. Newell and V.A. Preto. The cooperation and contributions of these individuals and agencies are gratefully acknowledged.

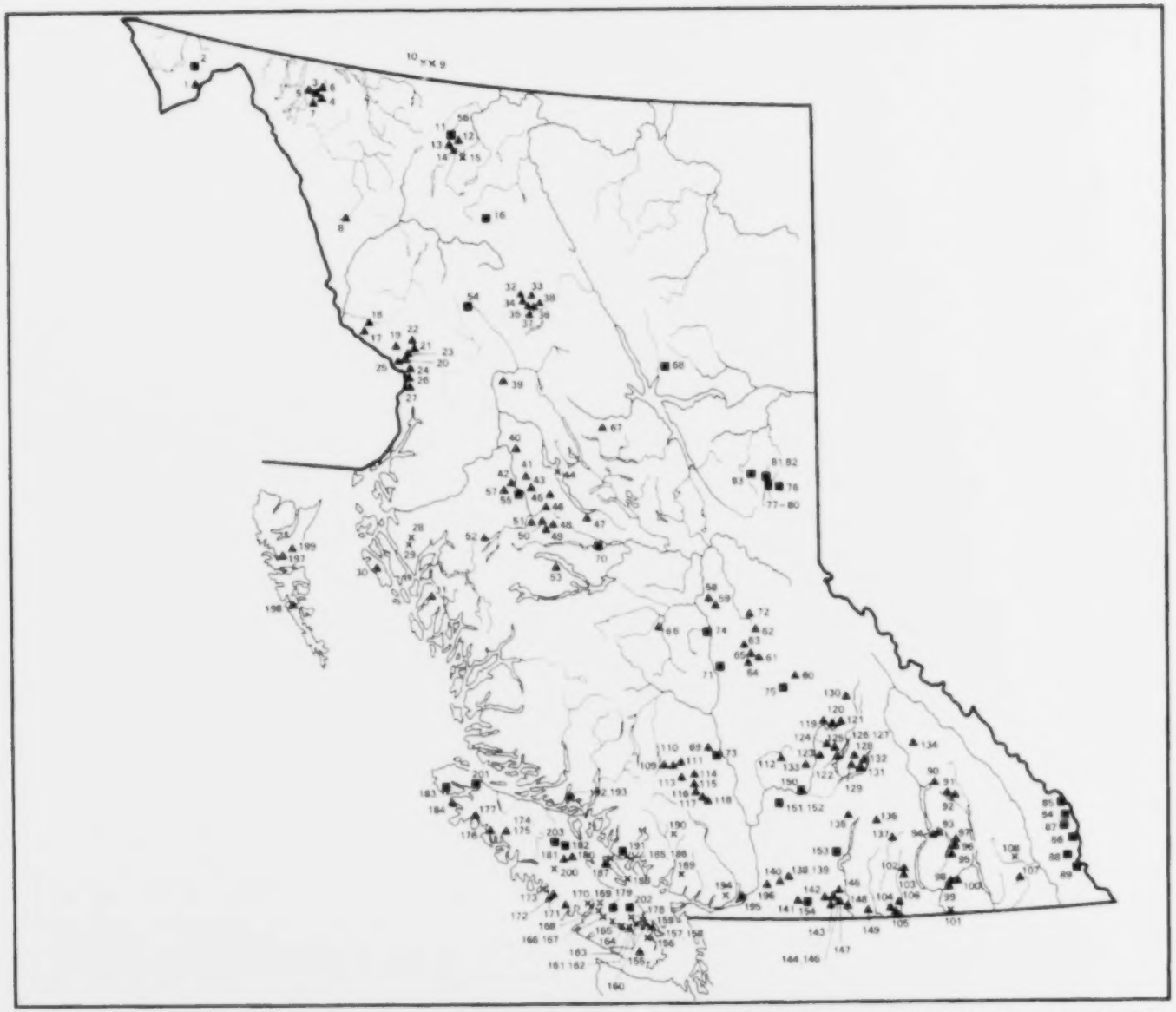

Figure 2. Selected Exploration and Development Projects in British Columbia, 1986 (▲ = precious metal projects; ✖ = polymetallic massive sulphide projects; ■ = other exploration and development projects including coal and nonmetallics).

TABLE 1. EXPLORATION AND DEVELOPMENT IN BRITISH COLUMBIA, 1986
(Map numbers are keyed to Figure 2)

Map No.	Property/MINFILE Name (Owner/Operator)	Inventory No.	Mining Division	NTS	Lat.	Long.	Commodity	Deposit Type	Work Done; Remarks; Assessment Report No.
NORTHWESTERN DISTRICT									
1	Low Jarvis, Low Herbert, Grizzly Heights (Mt. Henry Clay) (Stryker Resources)	114P-071, 064,068	Atlin	114P/7E, 7W,8W	59°20'	136°35'	Ag,Au,Cu, Pb,Zn,Ba	volcanogenic massive sulphide	9 ddh, >1500 m; mapping and prospecting
2	O'Connor Gypsum (Queenstake Resources)	114P-005	Atlin	114P/10E	59°38'	136°43'	gypsum	evaporite	8 ddh, 691 m; sampling and mapping
3	Yellowjacket (Homestake Mineral Development)	104N-043	Atlin	104N/12E	59°35'	133°33'	Au	vein (listwanitic)	14 ddh; airborne and ground geophysics; mapping and prospecting
4	Shuksan (Spruce Creek) (Placer Development)	104N-098	Atlin	104N/11W	59°34'	133°28'	Au	vein	17 ddh, approx. 1070 m; ground VLF-EM and mag. surveys
5	Red Jacket (Utopia) (Gallant Gold Mines)	104N-075	Atlin	104N/12E	59°35'	133°35'	Au	vein	6 ddh, 820 m; ground mag. and VLF-EM surveys
6	Lakeview/Ruby Mtn. (Cream Silver Mines)	104N-009, 006	Atlin	104N/11W	59°40'	133°25'	Au,Ag,Pb, Zn,Sn,W	vein	15 ddh, approx. 1830 m; ground mag. survey
7	McKee Creek (Perron Gold Mines)		Atlin	104N/12E	59°28'	133°32'	Au	vein	5 ddh, 701 m; ground mag. survey
8	Muddy Lake (Golden Bear) (North American Metals B.C./ Chevron Minerals)	104K-079	Atlin	104K/1W	58°13'	132°17'	Au,Ag	vein	14 surface ddh, 1457 m; 23 underground ddh; >465 m of underground development in progress; reported drill-indicated reserves, 1.15 x 10^6 t @ 10.6 grams/t
9	Midway (Strathcona Mineral Services/Nanisivik Mines/Mineral Resources International/Regional Resources)	1040-038	Liard	1040/16E, 16W	59°55'	130°15'	Ag,Pb,Zn, Ba	manto	11 ddh, 2182 m; 8 reverse circulation drill holes, 886.8 m; mag. and surface PEM surveys; soil geochem.; reported drill-indicated reserves, 1.185 x 10^6 t @ 410 grams/t Ag, 9.6% Zn, 7.0% Pb
10	Silverknife 1, 2 (Reg Resources)	1040-042	Liard	1040/16W	59°56'	130 22'	Ag,Pb,Zn	vein	3 ddh, >300 m
11	McDame (Cassiar Mining)	104P-084	Liard	104P/5E	59°20'	129°35'	asbestos	ultramafic	underground development, 547 m; 21 ddh, approx. 3450 m; 2000 m more drilling planned; reported reserves, 62 x 10^6 t

12	Taurus (Taurus Resources)	104P-012	Liard	104P/5E	59°20'	129°35'	Au,Ag	vein	underground development, 414 m; 21 ddh, 1208 m
13	Cordoba, Vollaug (Erickson Gold)	104P-070, 019	Liard	104P/4E, 5E	59°15'	129°37'	Au,Ag	vein	100 ddh, 11 348 m; trenching; geological mapping
14	Needlepoint Mtn., Rich (Colony Pacific Explorations)	104P-046	Liard	104P/4W	59°08'	129°47'	Ag,Pb,Zn	manto?	2 ddh; soil geochem.; geological mapping
15	Eagl (Casau Exploration)	104I-073	Liard	104P/3W	59°04'	129°28'	Zn,Sb,Pb, Cu	massive sulphide	6 ddh, >300 m; mag., VLF-EM and IP surveys
16	Jadex (Mohawk Oil Co.)	104I-078	Liard	104I/15	58°35'	128°	jade		drilling; trenching; road work
17	Johnny Mtn. (Reg) (Skyline Explorations)	104B-107	Liard	104B/11E	56°37'	131°02'	Au,Ag,Cu	vein	development, 503 m; 21 surface ddh, 1154 m; 6 underground ddh, 241 m; airstrip, 762 m
18	Snip (Delaware Resources Corp.)	104B-023	Liard	104B/11	56°41'	131°05'	Au,Ag,Zn, Cu	vein	13 ddh, 1495 m; soil geochem.; geological mapping; trenching
19	Doc (Magna Ventures)	104B-015?	Skeena	104B/8W	56°21'	130°28'	Au,Ag,Pb	vein	10 ddh, 915 m; proposed underground development
20	Kerr (Cassiar Mining)	104B-100	Skeena	104B/8E	56°28'	130°16'	Au,Ag	vein	drilling; trenching; geochem.
21	Sulphurets (Newhawk Gold Mines/ Lacana Mining)	104B-118	Skeena	104B/8E, 9E	56°30'	130°13'	Ag,Au	vein	427 m underground development; 47 ddh, 6098 m; surface mapping; drill-indicated reserves, 513 250 t @ 11.0 grams/t Au, 722.0 grams/t Ag
22	Gold Wedge (Catear Resources)	104B-105	Skeena	104B/8E	56°28'	130°10'	Au,Ag	vein	15 ddh, 793 m; blasting
23	Tide (Tenajon Silver)	104B-033?	Skeena	104B/8E	56°15'	130°05'	Au,Ag,Pb, Zn	vein	2 ddh, 454 m
24	Big Missouri (Westmin Resources)	104B-046	Skeena	104B/1E	56°08'	103°03'	Ag,Au		61 ddh, 2287 m; reported reserves, 2.226 x 10^6 t @ 2.57 grams/t Au, 32.6 grams/t Ag
25	Tennyson (Consolidated BRX Mining & Petroleum)		Skeena	104B/8E	56°16'	130°10'	Au,Ag	vein	6 ddh, 915 m
26	Silver Butte (Tenajon Silver)		Skeena	104B/1E	56°06'	130°02'	Ag,Au,Cu	vein	4 ddh; attempted to collar portal
27	Stibak Premier (Westmin Resources)	104B-054	Skeena	104B/1E	56°03'	130°00'	Au,Ag,Cu, Pb,Zn	epithermal	41 ddh, 5549 m; more surface and underground drilling proposed; reported reserves, 5.71 x 10^6 t @ 2.06 grams/t Au, 86.4 grams/t Ag

TABLE 1. EXPLORATION AND DEVELOPMENT IN BRITISH COLUMBIA, 1986 (CONTINUED)
(Map numbers are keyed to Figure 2)

Map No.	Property/MINFILE Name (Owner/Operator)	Inventory No.	Mining Division	NTS	Lat.	Long.	Commodity	Deposit Type	Work Done; Remarks; Assessment Report No.
NORTHWESTERN DISTRICT (CONTINUED)									
28	Ecstall (Falconbridge)	103H-011	Skeena	103H/3E	53°52'	129°31'	Cu,Zn,Pb, Ag,Fe	massive sulphide	5 ddh, 915 m; Max-Min, VLF-EM and mag. surveys; soil and silt geochem.; geological mapping
29	Red, Cart, Ecstall (Noranda)		Skeena	103H/13E	53°55'	129°32'	Cu,Zn,Pb, Ag	massive sulphide	airborne and ground EM surveys; geological mapping; prospecting
30	Yellow Giant (Trader Resources)	103G-009	Skeena	103G/8W	52°22'	130°09'	Au	vein	diamond drilling, 12 195 m; road construction; geophysics; reported reserves, Tel zone, 193 300 t @ 8.91 grams/t Au, 5.49 grams/t Ag
31	Surf Inlet (Trader Resources)	103H-027	Skeena	103H/2W	53°05'	128°53'	Au,Ag	vein	surveys; sampling of dumps and tailings
32	Al (Energex Minerals)	94E-091	Omineca	94E/6W	57°28'	127 23'	Au	vein	83 ddh, 3683 m; trenching; soil geochem. and IP surveys
33	Mets (Manson Creek Resources)	94E-093	Omineca	94E/6E	57°26'	127°08'	Au,Ag	vein	20 ddh, 1652 m; trenching
34	Metsantan (Lacana Mining)		Omineca	94E/6E	57°18'	127°04'	Au,Ag	vein	5 ddh, 616 m
35	Moosehorn (Cyprus Metals Canada)	94E-086	Omineca	94E/6E, 7W	57°20'	127°00'	Au,Ag	vein	12 ddh, 1067 m; soil and stream geochem.; trenching; geological mapping
36	Lawyers (Serem)	94E-066	Omineca	94E/6E	57°20'	127°12'	Au,Ag	epithermal	considering 500 t/day production decision; reported reserves, 941 000 t @ 7.2 grams/t Au, 260 grams/t Ag
37	Baker (Chapelle) (Multinational Resources)	94E-026	Omineca	94E/6E	57°17'	127°08'	Au,Ag	vein	23 ddh, 1920 m
38	Golden Neighbour (Lacana Mining)	94E-037	Omineca	94E/6E	57°18'	127°04'	Au,Ag	vein	5 ddh, 605 m
39	Goodridge & Bish (Tommy Jack) (Noranda Exploration)	94D-031, 036	Omineca	94D/4E	56°08'	127°36'	Ag,Pb,Zn	vein	10 ddh, 762 m; mag. survey

40	Skilokis/Blunt Mtn. (Noranda/Atna Resources)	93M-026	Omineca	93M/3E, 3W	55°14'	127 15'	Ag,Au	vein	3 ddh; geological mapping; geochem. and mag. survey
41	Silver King (Silver Hill Mines)	93L-201	Omineca	93L/15W	54°55'	126°53'	Ag,Au	vein	drifting, 15 m; staping, 6 m
42	Mamie (Consolidated Silver Standard Mines)	93L-091	Omineca	93L/14W	54°47'	127°21'	Ag,Au	vein	soil geochem.; mapping; prospecting; mag. and VLF-EM surveys
43	Dome Mountain (Canadian United Minerals)	93L-023, 022	Omineca	93L/10, 15E	54°44'	126°37'	Ag,Au	vein	>60 dh, >5000 m; trenching; soil geochem.
45	Topley (Bishop Resources Development)	93L-018	Omineca	93L/9E	54°32'	126°13'	Ag,Cu,Pb, Zn,Au	vein	26 ddh, 5266 m; soil geochem.; geological mapping
46	Bornite (Perow) (Equity Silver Mines)	93L-012	Omineca	93L/8W	54°30'	126°25'	Cu,Ag	vein	5 ddh, 624 m; geological mapping; trenching
47	Silver Fox (Imperial Metals)	93K-026	Omineca	93K/6W	54°24'	125°25'	Au,Pb,Zn, Cu	massive sulphide,	6 ddh
48	Equity Silver (Sam Goosly) (Equity Silver Mines)	93L-001	Omineca	93L/1W	54°10'	126°15'	Ag,Cu,Au, Sb	transitional	79 ddh, 14 416 m; trenching
49	Sam (Faraway Gold Mines)	93L-260	Omineca	93L/1W	54°10'	126°19'	Ag,Cu	disseminated	percussion and diamond drilling
50	Goosly Lake (Normine Resources)		Omineca	93L/1W	54°11'	126°22'	Au,Ag	disseminated	22 percussion drill holes, 1327 m; geochem.
51	Irk, Rose (E. Westgarde)	93L-265	Omineca	92L/2E	54°12'	126°35'	Cu,Pb,Zn		6 percussion drill holes, 380 m
52	New Moon (Newmont Exploration)		Omineca	93E/13E, 13W	53°57'	127°45'	Pb,Zn,Au, Ag	vein	17 ddh, 1529 m; trenching; detailed mapping; mag. and resistivity surveys
53	Duk (Asitka Resource)		Omineca	93E/9E, 12W	53°38'	126°00'	Au,Ag	vein	3 Winkie ddh, 77.7 m
54	Klappan (Gulf Canada Resources)		Liard	104H/1,2, 3,6,7,8, 9,10,11			coal (anthracite)		drilling; trenching; borehole geophysics; adit; 40 000 t test shipment
55	Telkwa (Crows Nest Resources)		Omineca	93L/11E	54°35'	127°08'	coal		4 ddh

CENTRAL DISTRICT

58	G (Gabriel Resources)	93G-004, 007,008	Cariboo	93G/1E	53°10'	122°20'	Au	massive sulphide	geophysics; 30 ddh, >2500 m
59	MC, Maast (Pundata Gold)	93G-025, 026	Cariboo	93G/1E	53°03'	122°04'	Au	massive sulphide	IP survey; 19 ddh, >1800 m
60	Frasergold (Eureka Resources)	93A-150	Cariboo	93G/7E	52°20'	120°35'	Au	gold in phyllites	diamond drilling; reverse circulation drilling; trenching; drill-indicated possible reserves, 3.6×10^6 t @ 3.1 grams/t Au

TABLE 1. EXPLORATION AND DEVELOPMENT IN BRITISH COLUMBIA, 1986 (CONTINUED)
(Map numbers are keyed to Figure 2)

Map No.	Property/MINFILE Name (Owner/Operator)	Inventory No.	Mining Division	NTS	Lat.	Long.	Commodity	Deposit Type	Work Done; Remarks; Assessment Report No.
CENTRAL DISTRICT (CONTINUED)									
61	QPW (Mt. Calvery Resources)	93A-061, 141	Cariboo	93A/12E	52°35'	121°27'	Au	gold in phyllites	trenching
62	Cariboo, Hudson (Imperial Metals)	93A-071	Cariboo	93A/14W	52°54'	121°21'	Au	quartz vein	diamond drilling, >2100 m
63	QR (Dome Exploration Canada)	93A-040, 041	Cariboo	93A/12W	52°40'	121°47'	Au	transitional	31 ddh, 2500 m
64	Cariboo-Bell (E&B Explorations)	93A-008	Cariboo	93A/12E	52°33'	121°39'	Au,Cu	transitional	21 ddh
65	Bullion Lode (Dome Exploration Canada)	93A-032	Cariboo	93A/12E	52°37'	121°41'	Au	transitional	5 ddh
66	Bob (Lac Minerals)	93B-054	Cariboo	93B/13E	52°55'	123°37'	Au,Ag	epithermal	21 ddh; IP survey
67	Takla (Imperial Metals)	93N-082	Omineca	93N/11W	55°39'	125°17'	Au	vein	17 ddh; geochem.
68	Atey (Cominco)		Omineca	94B/5W	56°27'	123°40'	Nb	carbonatite	diamond drilling, >1400 m; trenching, 1500 m; geophysics
NORTHEASTERN DISTRICT									
76	Shikano (Quintette Coal)			93I/14E	54°59'	121°01'	coal		37 rdh, 4363 m
77	Hermann Gething (Quintette Coal)			93I/14E	54°59'	121°01'	coal		37 rdh, 3360 m; 1 ddh, 81 m; geologic mapping and trenching; 15-t bulk sample
78	South Gething (Quintette Coal)			93I/14E	54°59'	121°10'	coal		1 ddh, 203 m; geologic mapping
79	Transfer (Quintette Coal)			93I/14E, 93P/3E	55°00'	121°06'	coal		7 ddh, 952 m (includes 1 redrill)
80	Grizzly (Quintette Coal)			93I/14E, 93P/3E	55°00'	121°04'	coal		2 ddh, 268 m (includes 1 redrill)
81	Wolverine (Quintette Coal)			93P/3E	55°04'	121°11'	coal		1 ddh, 145 m
82	Mesa Extension (Quintette Coal)			93P/3E	55°02'	121°12'	coal		4 ddh, 642 m; 95 rdh, 19 996 m tabulated as development drilling but includes holes outside pit boundary

SOUTHEASTERN DISTRICT

84	Greenhills (K-pit Extension) (Fording Coal)			82J/2W	50°12'	114°55'	coal		6 rdh, 1295 m; geological mapping
84	Greenhills (South) (Fording Coal)			82J/2W	50°09'	114°54'	coal		7 rdh, 2078 m; geological mapping
84	Greenhills (West Face) (Fording Coal)			82J/2W	50°12'	114°57'	coal		geological mapping
84	Castle Mountain (Fording Coal)			82J/2W	50°10'	114°49'	coal		geological mapping
84	Eagle Mountain (Fording Coal)			82J/2W	50°12'	114°50'	coal		3 ddh, 1218 m; geotechnical survey; 1 rdh, 268 m
84	Mount Turnbull (Fording Coal)			82J/2W	50°13'	114°51'	coal		2 rdh, 496 m; geological mapping
85	Aldridge Creek (Fording Coal)			82J/7W	50°19'	114°54'	coal		4 rdh, 787 m; geological mapping
86	Line Creek (Lower South Pit) (Crows Nest Resources)			82G/15W	49°56'	114°46'	coal		rotary drilling, 2765 m to end of October; more planned later in year
87	Burnt Ridge Extension (Crows Nest Resources)			82J/2W	50°05'	114°49'	coal		2 NQ ddh, 502 m; geological mapping
87	Greenhills (North) (Westar)			82J/2W	50°08'	114°53'	coal		50 rdh up to November 9, approx. 7990 m; 7 more holes planned
87	Greenhills (West Face) (Westar)			82J/2W	50°07'	1'4°53'	coal		26 rdh, 2340 m; geotechnical survey; trenching
87	Burnt Ridge Extension (Westar)			82J/2W	50°05'	114°50'	coal		geotechnical survey; trenching

WEST KOOTENAY DISTRICT

90	Goldfinch (Windflower Mining/ Grangos Exploration)	82K/NW-076	Revelstoke	82K/13E	50°49'	117°32'	Au,Ag	vein	diamond drilling, 4500-6100 m; AR 9137, 11267, 12895, 13920
91	Wagner (Mikado Resources/ Turner Energy)	82K/NW-212	Slocan	82K/11E	50°40'	117°12'	Ag,Pb,Zn, Cu,Au,Cd	vein	drifting, 14.3 m; raise, 10.7 m; 7 underground ddh
92	Abbott (Mikado Resources/ Turner Energy)	82K/NW-056	Slocan	82K/11E	50°38	117°09'	Ag,Pb,Zn, Cu,Cd,Au	replacement	portal rehabilitation; 152-m strike length diamond drilled
93	Illicum (Experanza Explorations)	82F/NW-234	Slocan	82F/13E	49°59'	117°44'	Au,Ag,Pb, Zn	vein	surface diamond drilling, 611 m; underground diamond drilling, 171 m; drifting, 115.5 m; AR 12269 (see also Table 2)

TABLE 1. EXPLORATION AND DEVELOPMENT IN BRITISH COLUMBIA, 1986 (CONTINUED)
(Map numbers are keyed to Figure 2)

Map No.	Property/MINFILE Name (Owner/Operator)	Inventory No.	Mining Division	NTS	Lat.	Long.	Commodity	Deposit Type	Work Done; Remarks; Assessment Report No.
WEST KOOTENAY DISTRICT (CONTINUED)									
94	Caribou 3-4 (A. Strobchuk)		Slocan	82F/13W	49°58'	117°39'	Au,Ag	vein	portal construction; drifting, 7 m; AR 12355
95	Willa (BP Canada, Rio Algom/Northair Mines)	82F/NW-071	Slocan	82F/14W	49°53'	117°22'	Au,Cu,Ag	diatreme	underground diamond drilling, 5235 m; drill-indicated reserves, West zone, 849 400 t @ 5.49 grams/t Au, 0.82% Cu; Willa zone, 3.4 x 10^6 t @ 1.48 grams/t Au, 4.8 grams/t Ag, 0.32% Cu
96	LH (Andeurex Resources/ Noranda Exploration)		Slocan	82F/14W	49°53'	117°20'	Au,Ag,As, Cu	vein	diamond drilling by Noranda; AR 14135
98	Star (Ryan Exploration)	82F/SW-083	Nelson	82F/6W	49°27'	117°21'	Au,Ag,Cu	breccia?	reverse circulation drilling, 762 m
99	Referendum (T. Cherry)	82F/SW-177	Nelson	82F/6W	49°25'	117°23'	Au,Ag,Si	vein	surface trenching; diamond drilling; AR 10239
100	Kena (O. Jancut/Lacana Mining)	82F/SW-273	Nelson	82F/6W	49°25'	117 16.4'	Au,Ag,Cu	vein	diamond drilling, 3049 m; AR 14023
101	Red Bird (Golden Eye Minerals)	82F/SW-024	Nelson	82F/3W	49°	117 23'	Pb,Zn	replacement	6 NQ ddh, 2692 m; AR 14960
102	Platinum Blonde (Suma Ventures/ Longreach Resources)	82E/NE-009	Greenwood	82E/9W	49°34'	118 21'	Au,Ag,Cu, Pb, Zn, Pt	vein	diamond drilling, 1280 m; further 1524 m planned; AR 3717
103	Union (Sumac Ventures)	82E/NE-003	Greenwood	82E/9W	49°34'	118°21'	Cu,Pb,Zn, Ag,Au	vein	surface diamond drilling, 610 m; underground rehabilitation
104	Skylark (Skylard Resources/ Viscount Resources)	82E/SE-011	Greenwood	82E/2E	49°05'	118°38'	Ag,Au	vein	decline, 178 m; crosscut, 9.1 m; drifting, 54.9 m raise, 15.2 m; reverse circulation drilling, 427 m; AR 11757
105	Golden Crown/Winnipeg (Consolidated Boundary Exploration)	82E/SE-032	Greenwood	82E/2E	49°04'	118°39'	Au,Ag,Cu	vein	diamond drilling; AR 8851
106	Hek, Hel (Consolidated Boundary Exploration)	82E/SE-179	Greenwood	82E/1W	49°12'	118°28'	Au,Ag	massive sulphides	AR 13546

107	PL 1775 and PL 1775 (Queenstake Resources)		Fort Steele	82F/8E	49°23'	116°01'	Au	placer	excavation to bedrock, 15.2 m
SOUTH CENTRAL DISTRICT									
109	Tyaughton Trough Hon/Chilcotin (Cominco/Esso Resources Canada)	930-011	Clinton	920/3W	51°08'	123°29'	Au	epithermal	soil geochem.; VLF-EM and mag. surveys; 1:5000 mapping; trenching
110	An, Bluff/Battlement Creek, Taylor-Windfall (Esso Resources Canada)	920-005, 028,063	Clinton	920/3E	51°06'	123°20'	Au,Ag,Cu, Pb,Zn, talc	epithermal	soil geochem.; VLF-EM and mag. surveys; 1:5000 mapping; trenching; drilling proposed
111	Big Creek (Esso Resources Canada)		Clinton	920/3E	51°11'	123°08'	Au	epithermal	soil geochem.; VLF-EM and mag. surveys; 1:5000 mapping; trenching
112	Precisely/Sem, RL (Inter-Pacific Resources/Placer Development)	92P-141	Clinton	92P/2W	51°07'	120°48'	Au	replacement, disseminated	22 ddh, Bridge zone (up to 4.5 g/t Au over 6.1 m, 24.7 g/t Au over 0.6 m); geophysics; drilling new target
113	Pilot/Mt. Penrose, ASB, PH (X-Cal Resources/ Manitou Contracting)	92J/NE-070	Lillooet	92J/15W	50°51'	122°56'	asbestos, Au	vein	drilling in progress testing 2 targets; de-watering, sampling and mapping underground
114	Congress (Levon Resources, Veronex Resources)	92J/NE-029	Lillooet	92J/15W	50 54'	122 47'	Au,Ag, (Sb,Cu, Pb,Hg)	vein and replacement	16 ddh, 2591 m, Lou zone; 5 ddh, Extension zone; commencing underground work; drill-indicated reserves, 607 500 t @ 8.3 grams/t Au
115	BRX/Whynot, Forty Thieves and others (Levon Resources/ Congress Operating Corp.)	92J/NE-021-026	Lillooet	92J/15W	50°50'	122°50'	Au (W, Mo,Ag,Cu, Zn)	vein and replacement	soil geochem; trenching; 7 major veins; several new Au anomalies; 2 ddh, 297 m; AR 7949
116	Pacific Eastern/Mix, Pioneer Extension (JTM Enterprises/ Normine Resources)	92J/NE-005,009	Lillooet	92J/10E, 15W	50°45'	122°45'	Au,Ag	vein and replacement	2 ddh, 1446 m; soil and rock geochem.; AR 2803, 2874, 3179, 3829, 4597, 22264
117	Standard/Standard, Royal (Armeno Resources/ Trans-Atlantic Resources)	92J/NE-015,014	Lillooet	92J/10E	50 42'	122 37'	Au,Cu,Pb, Zn,W	vein	18 ddh, 2200 m; IP, VLF-EM, mag. surveys; soil geochem.; mapping; 3 trenches; AR 8001, 8878

TABLE 1. EXPLORATION AND DEVELOPMENT IN BRITISH COLUMBIA, 1986 (CONTINUED)
(Map numbers are keyed to Figure 2)

Map No.	Property/MINFILE Name (Owner/Operator)	Inventory No.	Mining Division	NTS	Lat.	Long.	Commodity	Deposit Type	Work Done; Remarks; Assessment Report No.
SOUTH CENTRAL DISTRICT (CONTINUED)									
118	X-Cal Anderson Lake/ Brett, National, Diorite, Gold Hill (X-Cal Resources)	92J/NE-079,080, 081	Lillooet	92J/9W, 10E	50°33'	122°26'	Au	vein	drilling program in progress, 1525 m; quartz veins uncovered by trenching
119	Water/Sonja 2, CW (Newmont Exploration)	92P-049 82M-159	Kamloops	92P/9E, 82M/12W	51°38'	120°07'	Ag,Pb,Zn, Cu,Au	disseminated	2 ddh, 200 m; AR 6862, 7575
120	Hail, Harper Creek/ Goof, Sue, Hail (Quebec Cartier Mining/Aurun Mines)	82M-007, 009	Kamloops	82M/12W	51°52'	120°03'	Au,Ag,Cu, Mo,Tl	volcanogenic?	trenching; geological mapping; resampling old core; geophysics; bench tests to assess precious metal and rutile potential; existing reserves, 53 x 10^6 t grading 0.3% Cu, 0.016% MoS_2
121	Reg/Esp, Reg, Rob, Vav, Sonia (Newmont Exploration)	82M-121, 122,151, 152,158	Kamloops	82M/12E	51°36'	119°34'	Cu,Au	disseminated/ massive sulphides	2 ddh, 260 m; AR 6862, 12465
122	Chu Chua/CC, Chu Chua (Corp. Falconbridge Copper)	92P-140	Kamloops	92P/1,8E	51°22'	120°02'	Cu,Au,Zn, Ag,Co, talc, magnetite	volcanogenic massive sulphide	drilling; max-min survey; lithogeochem.; mapping; prospecting; AR 10940, 10957, 10958
123	Bar (CC, CH, SC, Anna) (Corp. Falconbridge Copper)	82M-059	Kamloops	82M/4W,5W 92P/8E	51°15'	120°00'	Cu,Pb,Zn, Au,Ag	volcanogenic massive sulphide	7 ddh, 900 m; mapping; soil geochem.; max-min survey; AR 13067, 13194
124	Birk Creek, B.C. Laranger Group, Semco Group/C-C, Anaconda, Fortune, Percy, Broken Ridge, May (A. Bably, J. Roberts, Noranda Exploration)	82M-067, 059,070-072,130, 131,219	Kamloops	82M/5W	51°21'	119°56'	Cu,Ag,Au, Pb, Zn	volcanogenic	IP survey; geochem.; 4 ddh, 2 in progress; AR 6802 6879 and others
125	Rea, HN (Corp. Falconbridge Copper)	82M-191	Kamloops	82M/4W	51°10'	119°47'	Cu,Pb,Zn, Au,Ag (Ba)	volcanogenic massive sulphide	ongoing diamond drilling (see text)
126	Kamad/Acacia (Esso Resources Canada)	82M-075	Kamloops	82M/4W	51°08'	119°50'	Pb,Zn,Au, Ag	volcanogenic massive sulphide	11 ddh, 1814 m; 1:2500 mapping; gravity and EM surveys; trenching; AR 12540

127	Twin (Apex Energy/ Lincoln Resources)		Kamloops	82M/4W	51°08'	119°47'	Cu,Pb,Zn, Au,Ag	volcanogenic massive	geology; geophysics; geochem.
128	Plsima Mtn., Goldfinger, Lode, Gold Pan, MN, Gold Flake (Camber Exploration/ Klillck Gold)		Kamloops	82M/3W, 82M/4E	51 06'	119 31'	Cu,Pb,Zn, Au,Ag	volcanogenic	road construction; AR 13304
129	Bowler Creek, Mosquito King/BC, CU (Killick Gold)	82M-138, 139	Kamloops	82M/3W,4E	51°00'	119°30'	Au,Ag,Pb, Zn,Cu,Fe, Mo,Cd	volcanogenic massive sulphide	3630 t ore hauled to mill; road construction; AR 5132, 11264 and others
130	CK/CK, Main, Boulder, New Mist, North, Raft, Synform, North Star (A. Horne/Verdstone Gold, Rea Gold)	82M-137, 224-228	Kamloops	82M/13E	51°48'	119°35'	Zn,Pb,Cu	stratiform	prospecting; linecutting; trenching; access roads; drill-indicated reserves, 1.49 x 10^6 t @ 8.6% Zn, 1.4% Pb, 8.6 grams/t Ag; AR 8317 and others
131	Scotch (Armour Development/ Nexus Resource Corp.)		Kamloops	82L/14W	50°58'	119°25'	Au	volcanogenic Fe formation	diamond drilling; IP surveys; geological mapping; trenching
132	Silver Lichen/Red, Fir, Jim, Mike (Killick Gold)	82M-154, 164,208 210	Kamloops	82M/3W	51°05'	119°24'	Pb,Zn,Au, Ag,Mn,Fe	volcanogenic sulphides and Au-bearing Fe formation	road construction to haul high grade to Bowler Creek mill; AR 11253, 12848, 13760 and others
133	Bonaparte/AJS, Rave (Minequest Exploration Associates)	92P-050	Kamloops	92I/16W, 1W,2E	51°00'	120°25'	Au,Mo,Cu	epigenetic veins	7 ddh, 1067 m; soil, silt and rock geochem.; geophysics; trenching; additional drilling planned
134	J & L Prospect, Sam, Tom, Burke/Standard, Roseberry (Pan American Minerals/ Noranda Exploration)	82M-003, 091,099	Kamloops	82M/8E	51°17'	118°08'	Ag,Pb,Zn, Au,As,Te	sedex (?)	underground mapping; bulk sampling; metallurgical testing; drill indicated reserves, 3.37 x 10^6 t @ 5.8 grams/t Au, 59.0 grams/t Ag, 2.15% Pb, 4.04% Zn; AR 12616, 10664, 10939
135	Brett/Brett (Huntington Resources/ W. Gruenwald)	82L/SW- 110	Vernon	82L/4E, 82L/5E	50°14'	119°34'	Au,Ag	vein and replacement	16 ddh, 792.5 m; AR 13471, 13469,
136	Lumby/Chaput (Quinto Mining Group)	82L/SE- 006	Vernon	82L/7W	50°16'	118°56'	Au,Ag,Pb, Zn,Mo	vein in shears	19 ddh; soil geochem.; VLF-EM and mag. surveys; 289 line-km airborne geophysics; drilling in progress; AR 6954

TABLE 1. EXPLORATION AND DEVELOPMENT IN BRITISH COLUMBIA, 1986 (CONTINUED)
(Map numbers are keyed to Figure 2)

Map No.	Property/MINFILE Name (Owner/Operator)	Inventory No.	Mining Division	NTS	Lat.	Long.	Commodity	Deposit Type	Work Done; Remarks; Assessment Report No.
SOUTH CENTRAL DISTRICT (CONTINUED)									
137	Top (Brican Resources)		Vernon	82L/2E	50°04'	118°32'	Au,Ag	epithermal	drilling in progress, VLF-EM and mag. surveys; soil and rock geochem.
138	Rabbitt (H. Adam/Abermin)		Similkameen	92H/10W	49°35'	120°48'	Cu,Pb,Zn, Au,Ag	vein	trenching; VLF-EM and mag. surveys; soil and rock geochem.
139	Gold Mount/Rabbitt (Monica Resources, Eagle Resources, Mt. Grant Mines/ Strato Geological Engineering)	92H/NE-014	Similkameen	92H/10W	49°33'	120°54'	Au,Ag,Cu, Pb,Zn	veins in shears	drilling in progress, testing extension of Rabbitt mine vein
140	Treasure Mtn., Silver Group, Hill, Vale/ Silver Chief, Eureka, Southern (Huldra Silver)	92H/SW-016,018, 019	Similkameen	92H/6E	49°25'	121°03'	Ag,Pb,Zn (Sb,Cd, Mn)	vein in shear	8 ddh, 940 m; trenching exposed vein for 220 m; AR 7463, 9152
141	Whipsaw Creek/Whipsaw, Metestoffer (Worldwide Minerals/ R.M. Huff, Lone Jack Resources)	92H/SW-097	Similkameen	92H/7E	49°16'	120°43'	Cu,Pb,Zn	vein, breccia	trenching, 550 m; 8 ddh, 940 m; soil geochem.; AR 2802, 4170, 5491
142	Pine Knot/Maple Leaf (Banbury Gold Mines, Noranda Exploration)	92H/SE-046	Similkameen/ Osoyoos	92H/8E	49°21'	120°08'	Au,Cu,Pb, Zn,Ag	vein, breccia, skarn	diamond drilling; v.g. in some holes (12 to date); AR 8057
143	Hedley Tailings (One-way Adventure Foundation/Candorado Mines)		Osoyoos	92H/8E	49°20'	120°05'	Au	tailings from Nickel Plate mine	metallurgical testing; drilling; feasibility studies; reserves 1 525 000 tonnes (dry) @ 1.4 grams/t Au; heap leaching planned
144	Nickel Plate (Mascot Gold Mines)	92H/SE-038,062	Osoyoos	92H/8E	49°22'	120°02'	Au,Ag,Cu (As,Co)	skarn/ replacement	development; pre-production construction; scheduled start-up June 1987; continued drilling downdip
145	Cahill (Consolidated Sea Gold/ Banbury Gold Mines)		Osoyoos	92H/8E	49 23'	120 00'	Au	skarn	4 ddh, 610 m to date; drilling ongoing

146	Canty/Canty (Golden North Resource Corp.)	92H/SE-060,064,	Osoyoos	82E/5, 92H/8	49°22'	120°00'	Au,Ag,Cu, Bi,Mo	skarn	diamond drilling; drill-indicated reserves, 690 000 t @ 3.7 grams/t Au; AR 8786, 8787
147	Star of Hope/Yuniman 1 (K. George/Shangri-la Minerals)	82E/SW-051	Osoyoos	82E/5W	49°19'	119°49'	Au	breccia	diamond drilling; trenching;
148	Stemwinder (Highland Valley Resources-Asarco)	82E/SW-007	Osoyoos	82E/4E	49°12'	119°37'	Au,Ag,Pb, Zn,Cu	vein	underground exploration; drill-indicated reserves, Main vein, 640 000 t @ 3.8 grams/t Au, 51.4 grams/t Ag; North veins, 185 000 t @ 9.2 grams/t Au, 103 grams/t Ag
149	Camp McKinney/ Cariboo-Amelia, Eureka, Sailor, Minnie Ha-Ha (W.E. McArthur/Ark Energy)	82E/SW-020,044-046	Greenwood	82E/3E	49°07'	119°11'	Au,Ag,Pb, Zn,Cu	vein	preparation for reopening mine; AR 8153, 9840
SOUTHWESTERN DISTRICT									
155	Valentine Mtn./Blaze (Beau Pre Explorations)	92B-108	Victoria	92B/12W	48°31'	123°51'	Au,Ag	veins	trenching; bulk sampling; milling tests; geological studies; AR 9050, 10110, 12642
156	King Solomon/Viva, Blue Bell, Finlay (Reward Res.-Nexus Resource Corp.)	92B-015, 034,035, 080	Victoria	92B/12E	48°41.5'	123°42'	Cu,Zn,Ag	skarn	geophysics; geochem.; geological mapping; diamond drilling; AR 11446, 13997
157	Pf/Cornucopia, Yreka (P.C. Postuk/ Falconbridge)	92B-038, 039	Victoria	92B/13E	48°51'	123°40'	Cu,Au,Ag		Geological mapping; geophysics; geochem.; drilling planned; AR 7233
158	West/Jane, Lucky Strike, Sally (Falconbridge)	92B-049, 091,092 093	Victoria	92B/13E	48°52'	123°40'	Cu,Zn		geological mapping; geophysics; geochem.; AR 11433, 13532
159	JRM/Fly (Utah Mines)	92B-076	Victoria/ Nanaimo	92B/13E,W	48°55'	123°49'	Cu,Jasper		geophysics; geological mapping; diamond drilling AR 12315, 12788, 14669
160	Mt. Sicker/Lenora, Tyee (Falconbridge Copper)	92B-001, 002,003, 087,088, 089,099	Victoria	92B/13W	48°53'	123°47'	Au,Ag,Cu, Zn,Pb,Ba	massive sulphides	geological mapping; geophysics; geochem.; diamond drilling; AR 7875, 8168, 12317
161	Lara (Abermin-Laramide Resources)		Victoria	92B/13W	48°52'	123°52'	Au,Ag,Cu, Zn,Pb	massive sulphides	geological mapping; geophysics; trenching; diamond drilling, approx. 11 000 m

TABLE 1. EXPLORATION AND DEVELOPMENT IN BRITISH COLUMBIA, 1986 (CONTINUED)
(Map numbers are keyed to Figure 2)

Map No.	Property/MINFILE Name (Owner/Operator)	Inventory No.	Mining Division	NTS	Lat.	Long.	Commodity	Deposit Type	Work Done; Remarks; Assessment Report No.
SOUTHWESTERN DISTRICT (CONTINUED)									
162	Chip, Holyoak/Pauper (Esso Minerals/ Falconbridge)	92B-040	Victoria	92B/13W, 92C/16E	48°54'	124°00'	Cu,Au,Ag	massive sulphides	geological mapping; geophysics; geochem.; trenching; diamond drilling; AR 11345, 14411
163	MNS, Chem, Cow, Mike (International Cherokee-Yanein Resources-Angle Nexus Resources)		Victoria	92B/13W, 92C/16E	48°53'	124°02'	Au,Cu,Zn		geochem.; geophysics; drilling planned;
164	Striker/Candy, Paula, Wardroper (Utah Mines)	92C-076, 113,114, 126	Victoria	92C/16E,W	48°54'	124°12'	Au,Cu, rhodonite		geophysics; geochem.; geological mapping; AR 14302
165	Heather (Canamin Resources/ Falconbridge Copper-International Cherokee)	92C-127	Victoria	92C/15E, 92C/16W	48°58'	124°30'	Cu,Au		geophysics; geochem.; geological mapping; 5 ddh, 548 m; AR 11303, 12445, 13516
166	Kitkat (Angle Resources/ Nexus Resource Corp.)		Victoria	92F/2E	49°03'	124°32'	Cu,Ag,Ni, Pt,Pd	massive sulphides; magmatic	geological mapping; geophysics; geochem.; drilling planned; AR 13945
167	Raft (Lode Resource Corp./ Yanein Resources)		Victoria	92F/2E	49°03'	124°35'	Au,Cu,Zn		geophysics; geochem.; drilling planned; AR 11315, 12444, 14376
168	Thistle (Nexus Resource Corp./ Westmin Resources)	92F-083	Alberni, Victoria	92F/2E	49°06'	124°39'	Au,Cu,Ag	massive sulphides	geophysics; geochem.; trenching and drilling planned
169	Debbie/Regina (Westmin Resources-Nexus Resource Corp.)	92F-078	Alberni	92F/2E	49°10'	124°40'	Au,Ag,Cu		geophysics; geochem.; geology; trenching and drilling planned; AR 2357, 8289, 10176
170	Kole (Mariah Resources-Amster Venture)	92F-103	Alberni	92F/2W	49°12'	124°52'	Cu,Ag,Au	shear zone replacement	drilled approx. 24 holes; some trenching; AR 10288,12052
171	United Bear/Bear (W. Ejtel/International Coast Minerals)	92F-044	Alberni	92F/3W	49°10'	125°25'	Au,Ag,Zn, Cu	vein	geophysics; geological mapping; trenching; bulk sampling; AR 5112
172	Tofino Nickel (P. Buckland/Cominco)	92F-029	Alberni	92F/4E	49°13'	125°37'	Cu,Ni,Ag, Pd,Pt	magmatic	geochem.; geophysics; geological mapping; AR 13121, 14182

173	Cypress/Bay Creek, Cat's Eye (Utah Mines)	92F-343, 344	Alberni	92F/4W	49°16'	125°50'	Cu		geophysics; geochem.; geological mapping; AR 3106, 3443, 3444
174	Privateer (New Privateer Mines)	92L-008	Alberni	92L/2W	50°02'	126°49'	Au,Ag	vein, skarn	underground development; sampling
175	Spud Valley/Goldfield (McAdam Resources)	92L-211	Alberni	92L/2W	50°01'	126°48'	Au,Ag	veins	geological mapping; sampling; diamond drilling; estimated reserves, 390 000 t @ 8.7 grams/t Au
176	Amai Inlet/Fll, Eclipse (Thomson Gold/J. Polonl)	92L-033, 101	Alberni	92L/3E	50°01'	127°06'	Au,Cu,Zn	vein	geochem.; geological mapping; 6 ddh, 550 m; AR 7062, 14369
177	Electrum (BP Minerals/Taywin Resources)		Alberni	92L/3W	50°10'	127°21'	Au,Ag	epithermal vein	stripping; trenching; geochem.; mapping; percussion drilling planned; AR 11664
178	Haslam Creek (Imperial Metals)		Nanaimo	92C/16E	48°58'	124°03'			geological mapping; 1 ddh, 64 m; AR 12678, 13359, 13468
179	Villeita (Canamin Resources)	92F-384	Nanaimo	92F/1W	49°06'	124°28'	Au,Fe	residual	7 vertical ddh, approx. 60 m; AR 8458, 12128
180	Mt. Washington/ Domineer, Murex (Better Resources)	92F-116, 117,206	Nanaimo	92F/11E,W 92F/14E,W	49°46'	125°18'	Au,Ag	epithermal veins, breccias	geochem.; trenching; diamond drilling, >30 holes; AR 11995, 11996, 12604, 12605
181	Joe Anne, Rina/Elnora (Iron River Resources/ Noranda Exploration)	92F-309	Nanaimo	92F/11W, 92F/14W	49°46'	125°21'	Au,Ag,Cu	epithermal veins, breccias	geochem.; geological evaluation; AR 13598, 13601
182	Chute Creek (Suipetro Minerals/ Nuspar Resources)		Nanaimo	92F/14W	49°53'	125°24'	coal		adit, 46 m
183	Quatsino Sound (Esso Resources)		Nanaimo	92L/12E,W 102I/9E	50°33'	127°55'	coal		geological recce mapping
184	Restless Mountain (Restless Mtn. Mines/ Acorn Resources)		Nanaimo	92L/5W	50°20'	127°58'	Au	shear zone	geochem.; geophysics; trenching; approx. 14 ddh
185	Holly (E. Johanson et al./ Northair Mines)		Nanaimo	92F/10E	49°43'	124°34'	Au,Cu	vein, skarn	geophysics; trenching; 13 ddh, 270 m
186	Yanande Gold/Little Billie, Cornell, Copper Queen, Texada (Ideal Cement/Yanande Gold)	92F-105, 106,107, 112,271, 395	Nanaimo	92F/10E, 92F/15E	49°44'	124°32'	Au,Ag,Cu, Fe, Zn, wollastonite	skarns	geological studies; geophysics; geochem.; drilling planned; AR 6770, 8004, 9300, 14425
187	Silver Tip, Nancy Bell, Tyee (Rhyolite Resources)	92F-261	Nanaimo	92F/10E	49°43'	124°35'	Au,Ag,Cu, Zn,Pb	veins	geophysics; geochem.; geological mapping; trenching; 13 ddh, 313 m
188	Sabine, Newt/Anderson Bay (Esso Minerals)	92F-087	Nanaimo	92F/8E, 92F/9E	49°31'	124°08'	Au,Ag,Cu, marble		geological mapping; geophysics; geochem.

TABLE 1. EXPLORATION AND DEVELOPMENT IN BRITISH COLUMBIA, 1986 (CONTINUED)
(Map numbers are keyed to Figure 2)

Map No.	Property/MINFILE Name (Owner/Operator)	Inventory No.	Mining Division	NTS	Lat.	Long.	Commodity	Deposit Type	Work Done; Remarks; Assessment Report No.
SOUTHWESTERN DISTRICT (CONTINUED)									
189	Indian River, Furry Creek/Brittania, Bank of Vancouver, Roy, Sun, London (Fleck Resources/ Falconbridge Copper)	92G/NW-003,004, 030 92G/NE-001,007, 017,018, 023,026	Vancouver	92G/10W, 92G/11E	49°35'	123°07'	Cu,Zn,Au, Ag	massive sulphides	geophysics; rock geochem.; geological mapping; drilling; AR 601, 10994
190	Callaghan, Edna (Falconbridge)		Vancouver	92J/3E	50°05'	123°10'			geological mapping; rock geochem.
191	Lang Bay/GE (Fargo Resources)	92F-137	Vancouver	92F/16W	49°48'	124°23'	germanium, gallium	sedimentary	refraction seismic survey; 9 rdh, approx. 300 m; metallurgical testing; AR 10384, 10921, 11263, 11738
192	Alexandria/Enid, Julie (Charlemagne Resources/ Nimbus Management)	92K-024, 028	Vancouver	92K/6W, 92K/11W	50°30'	125°24'	Au,Ag,Cu	vein	soil geochem., drilling planned; AR 10399, 11839, 12577
193	Doratha Morton (Signet Resources)	92K-023	Vancouver	92K/11W	50°31'	125°24'	Au,Ag	vein	6 ddh, 438 m; stripping; trenching; bulk sampling
194	Seneca/Dorothy, IAM, Lov, Harrison (Chevron Canada/ International Curator Resources/ BP Resources Canada)	92H/SW-083,069, 013	New Westminster	92H/5W	49°21'	121°55'	Cu,Pb,Zn, Au,Ag	massive sulphide	geophysics; geochem.; geological mapping; 28 ddh, 2672 m; AR 9844, 10894, 12522
195	Abo/GEO, RN (Abo Resource Corp./ Kerr Addison Mines)	92H/SW-092	New Westminster	92H/5E,W	49°20'	121°44'	Au	vein stock-works in quartz diorite	geology; geophysics; geochem.; 15 ddh, 1971 m
196	Master Ace (Newjay Resources)	92H/SW-043	New Westminster	92H/6E	49°22'	121°14'	Au,Ag		geophysics; geochem.; percussion drilling, 13 holes
197	Golden Dyke/Courte (Noramex-Umex/ Noranda Exploration)	103F-003	Skeena	103F/7E, 103F/8W	53°22'	132°28'	Sb,Au	epithermal vein	geological mapping; geophysics; geochem.; diamond drilling; AR 7440, 9698, 11533
198	Crescent (J.C. Stephen/ Goldenlode Resources)	103B-062	Skeena	103B/12W, 103B/13W	52°45'	131°53'	Au		geophysics; geochem.; AR. 8252, 9102
199	Cinola/Babe (Consolidated Cinola Mines)	103F-054	Skeena	103F/9E	53°31'	132°13'	Au	epithermal vein stockwork	major drilling program planned to begin before year-end; AR 7208, 8730, 11167

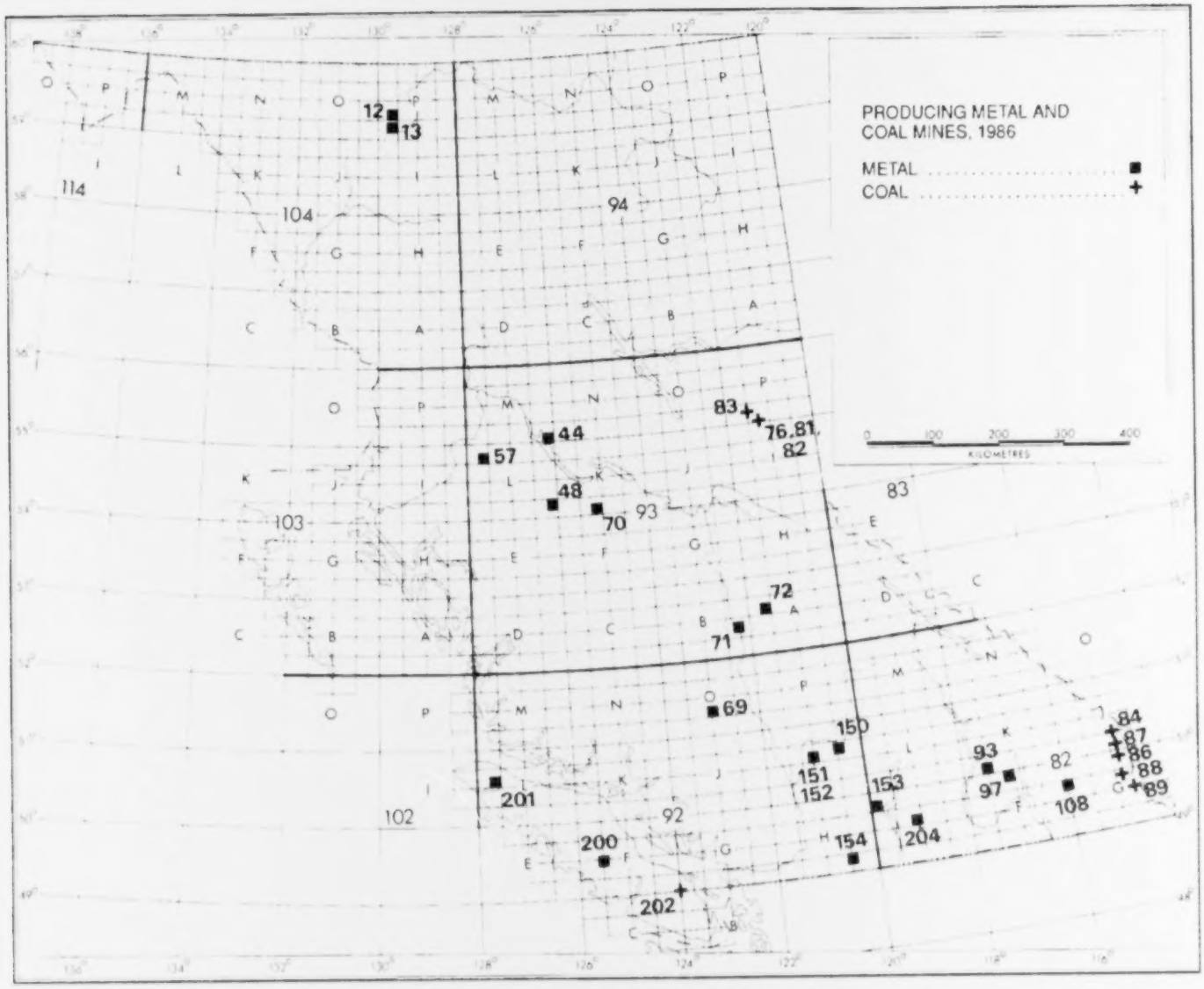

Figure 3. Producing mines in British Columbia, 1986.

TABLE 2. ACTIVE MINES IN BRITISH COLUMBIA, 1986
(Map numbers are keyed to Figure 3)

Map No.	Property/MINFILE Name (Owner/Operator)	Inventory No.	Mining Division	NTS	Lat.	Long.	Commodity	Deposit Type	Production and Development Data
NORTHWESTERN DISTRICT									
12	Taurus (Taurus Resources)	104P-012	Liard	104P/5E	59°20'	129°35'	Au,Ag	vein	127 t/day @ grade 4.46 grams/t Au; reserves, 18 140 t @ 14.1 grams/t Au
13	Erickson Gold (Erickson Gold Mines)	104P-029	Liard	104P/4E, 5E	59°15'	129°37'	Au,Ag	vein	new mill, 270 t/day capacity
44	Bell Copper (Noranda)	93M-001	Omineca	93M/1E	55°01'	126°14'	Cu,Au	porphyry	15 000 t/day; 16 ddh, 2284 m; reserves, 19 x 10^6 t @ 0.5% Cu, 0.6 gram/t Au
48	Equity Silver (Equity Silver Mines)	93L-001	Omineca	93L/1W	54°11'	126°16'	Ag,Au,Cu, Sb	transitional	10 000 t/day; 79 ddh, 14 416 m; trenching; reserves, Main zone, 139 x 10^6 t @ 111.6 grams/t Ag, 1.01 grams/t Au, 0.34% Cu; Waterline zone, 2.3 x 10^6 t @ 79.1 grams/t Ag, 0.70 gram/t Au, 0.31% Cu
56	Cassiar Asbestos (Cassiar Mining)	104P-005	Liard	104P/4E	59°14'	129°39'	asbestos	ultramafic	80 000 to 100 000 t/month
57	Duthie (P. Kindrat)	93L-088	Omineca	93L/14W	54°45'	127°22'	Ag,Au,Cu, Pb, Zn	vein	intermittent production, 1180 t milled
CENTRAL BRITISH COLUMBIA									
69	Blackdome (Blackdome Mining)	920-050 053	Clinton	920/7,8	51°20'	122°29'	Au,Ag	quartz vein	180 t/day; reserves, 200 000 t @ 25.4 grams/t Au, 96 grams/t Ag
70	Endako (Placer- Endako Mines Div.)	93K-006	Omineca	93K/3E	56°06'	125°18'	Mo	porphyry	3800 t/yr MoS_2; reserves 141 x 10^6 t @ 0.143% MoS_2
71	Gibraltar (Gibraltar Mines)	93B-006, 007,012, 013	Cariboo	94B/4E	52°27'	122°12'	Cu,Mo	porphyry	40 000 t/day; reserves, 163 x 10^6 t @ 0.3% Cu, 0.015% MoS_2
72	Mosquito Creek Gold (Mine (Mosquito Creek Gold Mines)	93H/10	Cariboo	93H/4E	53°06'	121°35'	Au	sulphide replacement	closed 1986; drifting, >320 m; drilling, 2200 m; SP survey
73	Frenier (Aurum Mines)	920-072	Clinton	920/4W	51°20'	122°21'	perlite	flows	road upgrading; 2100 t mined

74	Microsil	93G-023	Cariboo	93G/15E	52°56'	122°35'	diatomite	sedimentary	sales from stock
75	Boss Mountain (Noranda)	93A-001, 013-016	Cariboo	93A/2W	52°07'	122°54'	Mo	porphyry	permanently closed, 1986; reserves, 4.17 x 10^6 t @ 0.23% MoS_2
NORTHEASTERN DISTRICT									
76	Shikano (Quintette Coal)			93I/14E	54°59'	121°01'	coal		total development and production drilling at Quintette mine: 237 holes, 35 086 m; production from 3 pits, 5.0 x 10^6 t, predominantly metallurgical coal
81	Wolverine (Quintette Coal)			93P/3E	55°04'	121°11'	coal		
82	Mesa Extension (Quintette Coal)			03P/3E	55°02'	121°12'	coal		
83	Bullmoose (South Fork) (Teck Corp.)			93P/4E	55°07'	121°31'	coal		250 rdh, 6000 m development drilling; production, 1.7 x 10^6 t metallurgical coal
SOUTHEASTERN DISTRICT									
84	Fording River (Fording Coal)			82J/2W	50°12'	114°53'	coal		4.628 x 10^6 t, predominantly metallurgical coal
86	Line Creek (Crows Nest Resources)			82G/15W	49°56'	114°46'	coal		1.010 x 10^6 t, metallurgical; 0.652 x 10^6 t, thermal
87	Greenhills (Westar Mining)			82J/2	50°07'	114°52'	coal		1.685 x 10^6 t, metallurgical; 0.747 x 10^6 t, thermal
88	Balmer (Westar Mining)			82G/10,15	49°45'	114°49'	coal		3.6 x 10^6 t, predominantly metallurgical
89	Coal Mountain (Byron Creek Collieries)			82G/7,10	49°30'	114°40'	coal		0.875 x 10^6 t, thermal
WEST KOOTENAY DISTRICT									
93	Tillicum (Esperanza)	82F/NW-234	Slocan	82F/15E	49°59'	117°44'	Au,Ag,Pb, Zn	vein	3420 t shipped
97	Silvana (Dickenson Mines)	82F/NW-050	Slocan	82F/14W	49°58'	117°15'	Ag,Pb,Zn, Cd	vein	produced 225 376 t Ag, Pb,Zn,Cd ore
108	Sullivan (Cominco)	82F/NE-052	Fort Steele	82F/9E	49°41'	116°00'	Pb,Zn,Fe, Ag,Au,Cu, Cd,Sn	massive sulphides	2 157 300 t mined

TABLE 2. ACTIVE MINES IN BRITISH COLUMBIA, 1986 (CONTINUED)
(Map numbers are keyed to Figure 3)

Map No.	Property/MINFILE Name (Owner/Operator)	Inventory No.	Mining Division	NTS	Lat.	Long.	Commodity	Deposit Type	Production and Development Data
SOUTH CENTRAL DISTRICT									
150	Afton (Teck Corp.)		Kamloops	92I/10E	50°39'	120°30'	Cu,Au,Ag	porphyry	pit reserves, 8.35 x 10^6 t @ 0.69% Cu, 0.45 gram/t Au, 3.7 grams/t Ag; Pothook zone, 29 x 10^6 t @ 0.41% Cu, 0.58 gram/t Au
151	Valley Copper (Highland Valley Copper partnership between Cominco and Lornex Mining Corp.)		Kamloops	92I/11E	50°29'	121°05'	Cu	porphyry	reserves, approx. 560 x 10^6 t @ 0.4% Cu; planned increase in milling rate using Lornex mill
152	Lornex (see Valley Copper)		Kamloops	92I/6E	50°28'	121°04'	Cu,Mo,(Ag)	porphyry	reserves, 90 x 10^6 t @ 0.4% Cu, 0.02% Mo, 1.7 grams/t Ag
153	Brenda (Brenda Mines)		Osoyoos	82E/13W	49°48'	119°59'	Cu,Mo, (Ag,Au)	porphyry	reserves, 30 x 10^6 t @ 0.17% Cu, 0.034% Mo, 0.03 gram/t Au, 1.47 grams/t Ag; mine in production throughout 1986
154	Similkameen (Newmont Mines)		Similkameen	92H/7E	49°20'	120°32.5'	Cu(Au)	porphyry	reserves, 490 x 10^6 t, 0.38% Cu (recovered 0.17 gram/t Au)
204	Highland Bell (Teck Corp.)		Greenwood	82E/6E	49°25'	119° 04'	Ag,Pb, Zn	vein	34 120 t milled; production in concentrates, 9764 kg Ag, 102.3 t Pb, 126.0 t Zn
SOUTHWESTERN DISTRICT									
200	Myra Falls Operations (Westmin Resources)		Alberni	92F/12E	49°35'	125°35'	Cu,Zn,Pb, Au,Ag	porphyry	continued in full production at both H-W and Lynx mines, milling rate of 2770 t/day; proven and probable reserves at start of 1986, 11 948 586 t @ 2.4 grams/t Au, 40.1 grams/t Ag, 2.56% Cu, 0.37% Pb, 5.44% Zn; exploration drilling continues underground at H-W mine and in West "G" zone of Lynx mine

201	Island Copper (Utah Mines)	Nanaimo	92L/11W	50°36'	127°35'	Cu,Mo,Au	porphyry	continued full production; milling rate of about 47 200 t/day; geotechnical studies began on feasibility for recovery of substantial new mineralization located in 1985 beyond southeast wall of pit; systematic drilling of anomalous areas elsewhere on property continuing
202	Wolf Mountain (Wolf Mountain Management)	Nanaimo	92F/1E	49°07'	124°01'	coal		produced thermal coal intermittently at a rate of about 100 t/day
203	Quinsam (Quinsam Coal)	Nanaimo	92F/14W	49°56'	125°29'	coal		expect to produce about 10 000 t of thermal coal for local market in 1986

NORTHWESTERN DISTRICT

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INTRODUCTION

Exploration in the northwestern district continued to focus primarily on precious metal deposits, although two major programs involved with asbestos and coal hold considerable promise. The total number of exploration projects declined 21 per cent from 1985, but overall expenditures increased as many projects have entered an advanced exploration stage.

Major programs were completed at McLame (asbestos), Erickson Gold mine, Klappan (anthracite), Al (gold), Keg (gold), Sulphurets (silver-gold), Big Missouri (silver-gold), Silbak Premier (silver-gold), Banks Island (gold), Dome Mountain (gold), Bell Copper mine and Equity Silver mine (silver-copper-gold). Exploration activity increased in the Stewart, Iskut and Atlin areas compared to 1985. The Lawyers project (gold), in the Toodoggone area, was the most advanced with a production decision under consideration.

EXPLORATION

MINERALS

ATLIN MINING DIVISION

In the extreme northwest part of the province Stryker Resources Ltd. and Freeport Resources Inc. explored for volcanogenic massive sulphides and structurally controlled gold mineralization in the Mount Henry Clay area (1). Two holes were drilled on the Low Herbert showing and five on Grizzly Heights. Drilling on the Low Herbert penetrated chloritic alteration and intersected the structure as a zone of pyritization. Weather delays and technical difficulties hampered drilling at Grizzly Heights, but one hole cut a 21-metre intercept of silicified breccia. Boulders of baritic massive sulphide mineralization have been found on the margin of the Jarvis Glacier on Mount Henry Clay. Similar mineralization is reported in place, on a cliff above and to the south of the boulder occurrence. Two holes were drilled to test the inferred down-dip extension of this showing and intersected a weakly mineralized horizon, believed to be the source of the boulders.

Queenstake Resources Ltd. entered into a joint venture with Haines Gypsum Inc. to explore the O'Connor Gypsum evaporite deposit (2). Eight diamond-drill holes delineated reserves of 2.5 million tonnes of high-grade gypsum suitable for wallboard applications.

Homestake Mineral Development Company completed 14 diamond-drill holes on its Yellowjacket property (3) in the Atlin area. The drilling intersected free gold in quartz with minor arsenopyrite and pyrite, in a zone of carbonatized and silicified ultramafic and mafic volcanic rocks. Step-out drilling to the east cut a previously unrecognized zone with anomalous gold values. Gallant Gold Mines Ltd. attempted to drill the western extension of the Yellowjacket structure on its Utopia prospect (5), the old Red Jacket showing. A silicified fault zone, cutting intensely carbonatized ultramafic rocks and very weakly mineralized with pyrite, was intersected along Pine Creek, despite problems penetrating the thick overburden. At the Spruce Creek property (4), Placer Development Limited drilled 17 short holes to explore for the source of the placer gold in Spruce Creek. Drilling by Cream Silver Mines Ltd. on the Lakeview/Ruby Mountain property (6) intersected several quartz veins with associated pyrite and minor galena and sphalerite. The host rocks are silicified Cache Creek andesite with 5 per cent pyrite, and minor altered ultramafic rocks. South of Atlin, Perron Gold Mines Ltd. drilled five holes on the McKee Creek prospect (7) to test quartz stockwork mineralization in a shear zone cutting chert and ultramafic rocks.

In the Tatsamenie Lake area exploration continued on the Golden Bear prospect (8). North American Metals B.C. Inc. is now the operator, having entered into an option agreement with Chevron Minerals Ltd. The Bear zone was tested over a strike length of 350 metres, to a depth of 150 metres, by 14 surface drill holes, more than 465 metres of underground development and approximately 20 underground drill holes. Chevron's published reserves are 1.146 million tonnes averaging 10.6 grams/tonne gold. Extensive sampling of the underground workings has shown higher grades than anticipated in many areas. The best gold values in the Bear zone are associated with a quartz breccia along the hangingwall vein. The cost of the 1986 program exceeded $3 million; results will be used to better define the ore reserves and to provide engineering data for a mine feasibility study.

1400' main level drift

LIARD MINING DIVISION

There was relatively little activity in the Rancheria area in 1986, however the Midway joint venture continued drilling on the Midway project (9). Four holes were completed north of the mine area; one extended the carbonate-hosted mineralization 100 metres to the north. An additional four holes were drilled further to the northwest with little success. One of three holes drilled to test an unexplored area 1.5 kilometres south of the deposit intersected oxidized sulphide mineralization. An oxide zone on the Bull 7 claim was tested by reverse circulation drilling. Current reserves on the Midway property are reported to be 1.185 million tonnes grading 410 grams/tonne silver, 9.6 per cent zinc and 7.0 per cent lead.

Also in the Rancheria area, Req Resources Ltd. completed more than 300 metres of drilling on the Silverknife property (10).

All three operating mines in the Cassiar area completed exploration programs to increase their reserves. Cassiar Mining Limited spent more than $4 million on the McDame deposit (11) which is estimated to contain 62 million tonnes of asbestos ore (see Developments).

At the nearby Taurus mine (12), Taurus Resources Ltd. explored on the minesite and west of Quartzrock Creek on the Sable property. Fourteen holes were drilled at the Taurus mine, totalling 942 metres from surface and 152 metres underground. Underground development work on the Sable property included driving a 98-metre decline, 305 metres of drifting and 10.7 metres of raising to access a mineralized quartz vein intersected in a drill hole from surface. Seven holes, totalling 114 metres, drilled from the drift, failed to intersect significant mineralization.

Erickson Gold Mining Corp. conducted an aggressive exploration program on its Cassiar claims, principally on the Vollaug vein and Cusac option (13). Gold mineralization occurs in fault zones cutting volcanic rocks typically altered to listwanite. New ore reserves have been defined in the Troutline II, Troutline III and G-H zones on the Vollaug vein. Drilling has extended the strike length of the G-H zone to over 500 metres with the west end open. The Troutline II oreshoot is 310 metres long and where cut by an exploration drift assays 20.6 grams/tonne gold over a width of 80 centimetres. The exploration drift will also be used to explore the G-H zone. An oreshoot 300 metres long has been defined in the Troutline III zone. Six previously unknown auriferous veins have been discovered by trenching and diamond drilling on the Cusac option.

South of Cassiar, Colony Pacific Explorations Ltd. carried out a modest exploration program on its Needlepoint Mountain property (14). Two drill holes cored massive sulphides, including one intersection in carbonates of the Lower Cambrian Good Hope Group averaging 17.34 per cent zinc, 6.50 per cent lead and approximately 300 grams/tonne silver over 1.18 metres. The company believes the mineralization to be manto type. North of Dalton Mountain, Casau Exploration Ltd. attempted to find the source of massive sulphide float on its Eagl property (15). Drilling to test geophysical targets intersected graphitic sediments and a siliceous iron carbonate zone which returned assays averaging 9.1 grams/tonne gold over 60 centimetres.

In the Kutcho Creek area, Mohawk Oil Company Ltd. completed a limited program of exploration for nephrite jade on the Jadex property (16). Trenching and packsack diamond drilling proved approximately 45 tonnes of mineable jade and outlined an estimated 90 tonnes of possible jade reserves.

Skyline Explorations Ltd. carried out an extensive exploration program on its Johnny Mountain (Req) prospect (17) in the Iskut River area. An adit was collared at the 1122-metre elevation and 503 metres of drifting completed to gain access for underground sampling and drilling on the Cloutier vein system. A total of approximately 250 metres was drilled underground and 21 surface holes were completed. Company reports

SHORE ZONE
WEST ZONE

on the West, Shore and Gossan zones. A 365-metre decline was driven to access the West zone for drilling and sampling. The West zone has been tested to a depth of 150 metres over a strike length of 300 metres. Two deeper holes cut intercepts at a depth of approximately 300 metres assaying 18.6 and 14.4 grams/tonne gold over 12 metres and 4 metres respectively; both intersections returned high silver values. Samples from the first crosscut through the West zone returned assays averaging approximately 7 grams/tonne gold and 210 grams/tonne silver across a true width of 5.2 metres. Current drill-indicated reserves in the West zone are reported at 513 250 tonnes averaging 11.04 grams gold and 722.6 grams silver per tonne, with substantial additional tonnage inferred.

North of Sulphurets on the Gold Wedge property (22), Catear Resources Ltd. drilled 14 holes to test a northeast-trending stockwork zone in sericite schists, and one hole on a second, northwest-trending zone. Bonanza gold grades were returned from several intersections. On the Tide property (23), Tenajon Silver Corp. drilled two holes to test an electromagnetic anomaly in an area where grab sampling had indicated gold mineralization; no significant mineralization was intersected. Tenajon Silver also drilled on the Silver Butte prospect (26); four holes were drilled from two setups to follow-up an earlier intersection averaging 27.1 grams gold and 89.8 grams silver per tonne over 4.5 metres. All four holes intersected gold-silver mineralization.

Following a late start, Westmin Resources Limited completed an extensive drilling program designed to increase definition and add to reserves in the Big Missouri (24) and Silbak Premier (27) deposits. All four main gold-bearing zones at Big Missouri were drilled and publication of a new reserve estimate is expected. Current reserves are quoted as 2.226 million tonnes grading 2.57 grams gold and 32.6 grams silver per tonne. In the Glory Hole area at the Silbak Premier mine higher grade intersections were obtained drilling through caved stopes, including one intercept averaging 8.13 grams/tonne gold over 49.4 metres. Two holes were drilled in the Simcoe area, 600 metres southeast of the Glory Hole. Underground diamond drilling, and possibly percussion drilling on the 4 level dump, are likely to continue until the end of the year. Reserves at the Silbak Premier are currently reported as 5.71 million tonnes averaging 2.06 grams gold and 86.4 grams silver per tonne. In October, Westmin Resources submitted a prospectus on the Silbak Premier and Big Missouri to the British Columbia Mine Development Steering Committee.

Forty-five kilometres north of Stewart, Consolidated BRX Mining & Petroleum Ltd. drilled six holes on its Tennyson prospect (25) and reported a 2.1-metre intersection assaying 41.8 grams/tonne gold.

For the first time in over 25 years, serious exploration was carried out on the massive sulphide deposits of the Ecstall River area. Falconbridge Limited completed geophysical surveys and drilled five holes to test electromagnetic anomalies on its Ecstall property (28). Noranda Exploration Company Ltd. completed a Dighem airborne electromagnetic survey, followed by ground geophysics, prospecting and geological mapping, on its Ecstall (29) property nearby.

Trader Resources Corp. continued work on Bells (Tel), Tundrat, Grizzly, Geophysical surveys and road construction were carried out on the Yellow Giant property (30). Approximately 3500 metres of drilling was completed on the Crossbreak zone. Diamond drilling on the Tel zone, totalling more than 10 000 metres, discovered a new zone dipping from previously known mineralization. Current reserves in the Tel zone are quoted as 193 375 tonnes averaging 8.91 grams gold and 5.48 grams silver per tonne. A 4-kilometre road was built from the west coast of Banks Island to the Tel zone, in preparation for driving a decline to provide access for underground drilling and sampling. (34)

Trader Resources has also started an assessment of the Surf Inlet mine (31) on Princess Royal Island. Mine dumps and tailings were sampled and environmental studies begun. Trader Resources has made submissions to the Mine Development Steering Committee covering both the Tel deposit and the Surf Inlet property.

OMINECA MINING DIVISION

In the Endako River area, Energex Minerals Ltd. spent approximately $2 million on the AJ project (32). Diamond drilling on the BV, Bonanza, Thesis II and Thesis III zones, designed to provide better definition of open pit potential, extended the known strike length of all

Figure 1. In the foreground is the Kingston gold-bearing area of the Yellow Giant property (30) of Trader Minerals Corp. The gold is in quartz veins in the Nass Formation (Jn) of Hazelton Group sedimentary rocks.

four zones. The principal focus of activity was the Thesis III zone where a total of 29 holes was drilled and 900 channel samples were taken. A small test pit was mined and 12 000 grams of gold recovered in a 6-tonne per day portable mill. Drilling on the BV zone confirmed continuity of mineralization over widths of 6 to 9 metres, with average grades in the range of 10 to 17 grams/tonne gold. High-grade intersections were cored in the Bonanza zone, some 140 metres south of previously known mineralization.

Manson Creek Resources Ltd. drilled on the Mets prospect (33) immediately south of the Bonanza zone. The auriferous quartz-barite breccia zone was traced to a depth of 90 metres over a strike length of 150 metres, with true widths ranging from 5 to 10 metres. One hole is reported to have intersected 13 metres assaying 18.1 grams/tonne gold. Lacana Mining Corporation explored its Metsantan property (34), also immediately south of the Energex claims. Anomalous gold values, with two higher grade sections, were reported from drilling on a northerly trending siliceous "cap". A comprehensive program of geological mapping and geochemical sampling was completed on the Moosehorn property (35) by Cyprus Metals Canada Ltd. Eight drill holes tested the Moosehorn structure which outcrops as quartz and quartz-amethyst veins in a bleached andesite porphyry host. Four holes, drilled in an area of mineralized quartz float approximately 1100 metres southeast of the Moosehorn showing, intersected a southwest-dipping zone carrying geochemically anomalous gold values.

At the former Baker mine (37), Multinational Resources Inc. drilled 22 holes on the B vein and one on the A vein. The B vein, weakly mineralized with pyrite and chalcopyrite in a quartz gangue, averages 2.5 to 3 metres in width and has been traced over a strike length of 120 metres and to a depth of 60 metres. The structure is open and may be an extension of the A vein. One of the better intersections reported assayed 41.1 grams gold and 102.9 grams silver per tonne. Lacana drilled five holes, to test a gold soil-geochemical anomaly 1200 metres long, on its Golden Neighbour prospect (38) located 7 kilometres northeast of the Baker mine. The holes intersected quartz veining, with pyrite, chalcopyrite and minor amethyst, over widths of 10 to 12 metres.

Noranda Exploration, in a joint venture with Goldcap Inc., completed 10 diamond-drill holes on the Tommy Jack (39) property west of Motase Peak. Further to the south, Noranda and Atna Resources Ltd. have a joint venture on the Blunt Mountain property (40) where a northeasterly trending, steeply dipping structure can be traced for 2.5 kilometres. Pyrite, arsenopyrite, galena and lesser sphalerite are present in veins, fracture fillings, disseminations and pods along it. A grab sample taken at the northern end of the zone is reported to assay 13 grams gold and 1097 grams silver per tonne. Three holes were drilled and at least one intersected two massive sulphide zones over core lengths of 2.8 and 1.1 metres.

In the Smithers area, Silver Hill Mines Ltd. continued exploration of the Silver King prospect (41). An access road was built

and 21 metres of underground development work completed. Consolidated Silver Standard Mines Limited carried out soil sampling, magnetometer and VLF-electromagnetic surveys, prospecting and geological mapping on its Mamie property (42) adjacent to the Duthie mine. On Dome Mountain (43), a joint venture between Noranda Exploration, Canadian United Minerals Inc. and Teeshin Resources Ltd. attracted considerable attention. Canadian United completed 4450 metres of drilling in 48 holes and have reported a mineral inventory of 218 000 tonnes grading 15.7 grams gold and 79.5 grams silver per tonne in the Boulder Creek zone. The Boulder Creek quartz vein averages 2.7 metres wide and carries minor amounts of pyrite sphalerite and galena. Trenching and drilling in an attempt to trace the vein westwards into the Cabin vein has yielded inconclusive results. Late in the year Teeshin Resources resumed drilling on the Boulder Creek zone.

In the Houston area, Bishop Resources Development Ltd. completed an extensive surface exploration program and drilled 26 holes on its Topley project (45). Work was concentrated on a silver-rich vein system located between the Silver Cup and Golden Eagle showings. The quartz-dolomite veins contain tetrahedrite and minor galena, sphalerite, stibnite, freibergite and native silver; the wallrocks contain finely disseminated pyrite. One of the better intersections reported graded 227.3 grams silver and 2.81 grams gold per tonne over 2.3 metres. Equity Silver Mines Limited completed geological mapping, 500 metres of trenching and five diamond-drill holes on its Perow project (46).

At the eastern end of Babine Lake, Imperial Metals Corporation explored for massive sulphides and precious metal lode deposits on the Silver Fox property (47). Three holes, drilled to test a zinc and silver anomaly in soils, associated with an induced polarization chargeability anomaly, intersected graphitic horizons. Three additional holes on the Silver Fox Crown grant did not intersect significant mineralization.

In the Goosly Lake area, south of Houston, Equity Silver Mines completed 79 diamond-drill holes to further delineate mineralized zones and to explore untested targets at the minesite (48). Approximately 20 per cent of the drilling was concentrated on the Main and Waterline zones and resulted in a modest increase in reserves. Two new mineralized zones were discovered, one south of the Southern Tail pit, the second north of the Waterline zone. Faraway Gold Mines Ltd. carried out percussion and diamond drilling on the Sam property (49). The work was centred on a heavily drift-covered window in the Tertiary cover and outlined a zone of pyritic mineralization in older volcanic rocks. On the adjacent Goosly property (50), Normine Resources Ltd. percussion drilled a total of 1018 metres on the east grid, but drilling on the west grid, to test a geochemical anomaly, failed to reach bedrock. On the Irk prospect (51), E. Westgarde completed six percussion holes, totalling 380 metres; mineralized intrusive rocks were cut in several holes.

Near Norice Lake, Newmont Exploration of Canada Limited completed a comprehensive program of geological mapping, prospecting and rock and silt sampling over much of its New Moon property (52). Seven

zones of polymetallic mineralization were investigated by detailed mapping, magnetometer and resistivity surveys, trenching and 1529 metres of diamond drilling in 17 holes. The showings are quartz-carbonate veins and stockworks, containing appreciable galena and sphalerite with minor pyrite and chalcopyrite, hosted by volcanic and volcaniclastic rocks of the Hazelton Group. South of Cotsa Lake, Seltka Resource Corporation drilled three holes on its Sue claims (53). Anomalous gold and silver values are reported in quartz-veined rhyolite within an argillic alteration zone.

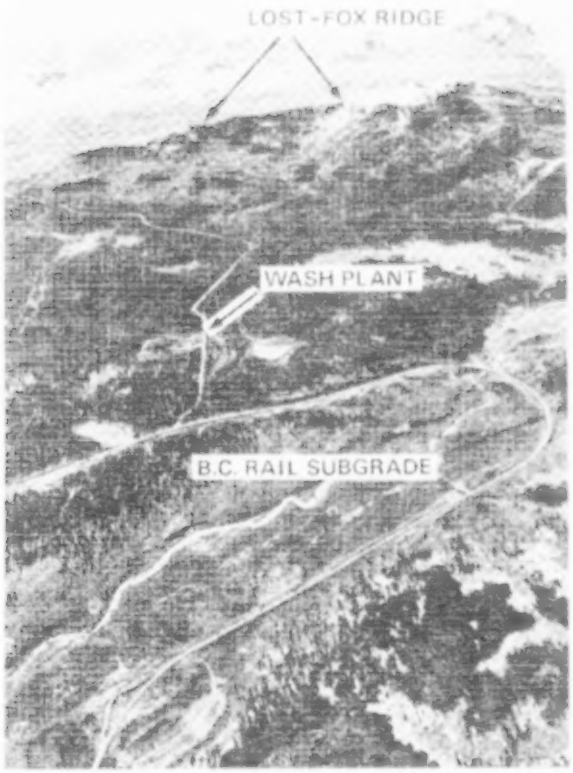

Plate 3. A view of the Lostfox area from the northwest of Gulf Canada Resources Inc.'s Mount Klappan anthracite project (54). Note the B.C. Rail subgrade, wash plant and access road in the foreground. (Photo courtesy of Gulf Canada Resources Inc.)

COAL

Gulf Canada Resources Inc. completed diamond and rotary drilling, trenching, borehole geophysics and mapping on its Klappan

anthracite property (54). A second adit was completed to test unoxidized anthracite in the 0 zone. A 40 tonne trial parcel of coal was shipped through Stewart to the South Korean market. A Phase II report is anticipated by the end of 1990. Cyprus Yukon Resources Ltd. drilled four holes on its Zolewa property (55).

PLACER

A total of 81 placer notices of work was filed in the Atlin area, down slightly from 1989. The most active streams were Boulder, Gold Run, McKee, O'Donnell, Otter, Spruce, Wilson and Wright. A total of 44 placer notices of work was filed in the Liard Mining Division, a level of activity comparable to 1989. Deane Creek, Hyland River, McDame Creek, Rancilla Creek and Thibert Creek were the busiest placer areas.

DEVELOPMENT

Cassiar Mining Limited continues to explore the McDame asbestos deposit (11). Underground development consisted of 302 metres of drifting and 247 metres of raising from the 1415 level to the 1561 level. The drift was continued along the hangingwall of the deposit and some ore was tested in the mill. A proposed decline to the 1350 level was postponed.

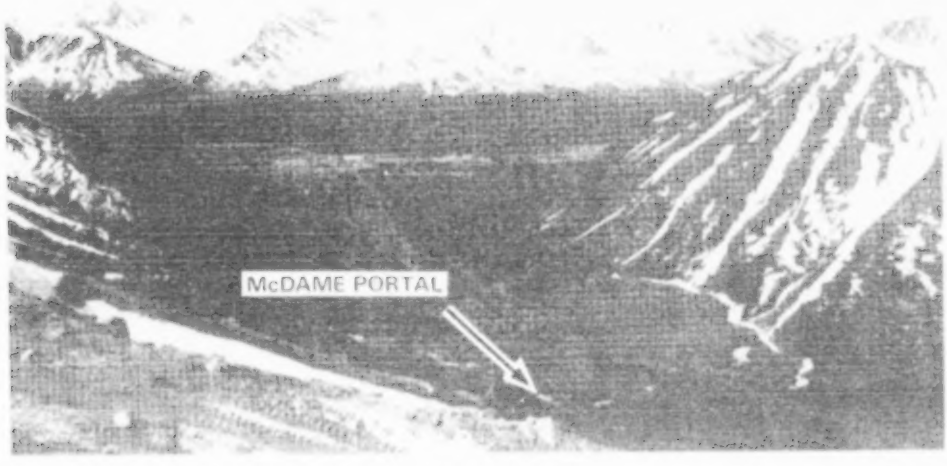

Plate 4. Looking to the south from the edge of the Cassiar open pit towards the McDame portal (11). The height of the bottom of the photograph.

until more drilling information is available. Twenty-one holes were drilled to determine the geometry of the strongly faulted orebody. The deposit will be mined by block caving with costs expected to be lower than current costs in the Cassiar open pit.

The Lawyers deposit (36), in the Toodoggone River area, remained on hold. Current reserves are quoted at 941 000 tonnes grading 7.2 grams gold and 260 grams silver per tonne. The British Columbia Government has agreed to provide an interest-free loan of up to $4.5 million, to fund extension of the Omineca road into the Toodoggone district, contingent on Serem Inc. making a production decision.

PRODUCERS

The Cassiar asbestos mine (56) produced 80 000 to 100 000 tonnes of asbestos per month in the latter part of the year (Table 2). The mine was closed from July 1 to September 30, to reduce inventory. At current production rates the open pit will be exhausted in 1990.

The nearby Taurus mine (12) operated at a rate of 125 tonnes per day with an average millhead grade of 4.46 grams/tonne gold. Current reserves are estimated at 18 140 tonnes averaging 14.1 grams/tonne gold.

Erickson Gold Mining Corporation commenced production from the Cusac adit (13) in July, following a winter shut-down caused by a fire in the mill. Ore was processed at the Taurus mill from July through September. The new Erickson mill, with a 270-tonne daily capacity, started production in October; average millhead grade is expected to be 13.7 grams/tonne gold.

Intermittent production continued at the Duthie mine (57); high-grade silver ore was mined from the 3300 level on the Ashman vein. A total of 1180 tonnes of ore was milled. The property was bought by Bishop Resource Development Ltd. in the fall.

The Bell Copper mine (44) operated at a milling rate of 15 000 tonnes/day. A recent drilling program on the west wall of the pit increased ore reserves to 19 million tonnes grading 0.5 per cent copper and 0.6 gram/tonne gold, extending the mine life to the end of 1989.

The Equity Silver mine (48) operated at a milling rate of 5700 tonnes per day for the first half of the year. Subsequently milling capacity was increased to 10 000 tonnes per day which permitted a reduction in cut-off grade and lowered the cost of milling ore from the Main zone. Current reserves are: 13.876 million tonnes grading 111.6 grams/tonne silver, 1.01 grams/tonne gold, 0.34 per cent copper in the Main zone; and 2.256 million tonnes averaging 79.1 grams/tonne silver, 0.70 gram/tonne gold and 0.31 per cent copper in the Waterline zone.

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INTRODUCTION

There were 120 mineral exploration programs undertaken in the district during 1986, an increase of 10 per cent over 1985. Sharp decreases in the Clinton and Omineca Mining Divisons were more than offset by a 61 per cent increase in the Cariboo Mining Division. The number of major drilling programs (10 or more holes) was also up by 70 per cent over 1985, and included several late-season and winter drilling programs.

Precious metal targets remain the principal focus of exploration. After a slow start, placer operations are now close to 1985 levels, following the summer increase in gold prices. Interest in industrial minerals and stone picked up slightly, with some contract sales from two of the area's limestone quarries and five new exploration programs (three limestone deposits, one talc deposit, one slate prospect).

REGIONAL GEOCHEMICAL SURVEY RELEASE

The Regional Geochemical Survey data for NTS 93G, 93H and 93J were released on 9 July 1986. The releases for 93G and 93H incorporated the data for 93G (east half) and 93H (west half) which were released in 1985. Interest in 93G (west half), 93H (east half) and 93J was modest, but the 1985 release continues to exert a strong influence on staking and exploration activity. The two releases are estimated to have been a factor in at least half of the net increase of 1636 units staked in the release areas since 1985 and to have generated close to $1 million in exploration expenditures. Most of the new staking covered areas of multi-element anomalies possibly related to volcanogenic massive sulphide mineralization in the Quesnel trough, or base metal and barium anomalies possibly related to sediment-hosted base metal and silver mineralization.

EXPLORATION

Table 1 lists the more significant exploration programs completed or announced in the district for 1986. The project numbers in the table and in the text following are keyed to the location map, Figure 2.

MINERALS

Activity in the Cariboo district was concentrated on four deposit types.

Volcanogenic Massive Sulphide Deposits: The search for polymetallic massive sulphide or bulk-mineable deposits concentrated on the Triassic Takla Group, with some interest in the Mississippian Slide Mountain Group. Junior companies were especially active north of Cottonwood House, the scene of a staking rush early in the year. The area has known massive sulphide showings and contains some of the Cariboo's most productive placer deposits. It is also heavily drift-covered and the structure appears complex. Gabriel Resources Inc. has drilled more than 2500 metres in 30 holes on three target areas on their G claims (58). Two areas have yielded scattered intersections up to 3 metres assaying from 0.4 to 10 grams per tonne gold. Pundata Gold Corporation has completed 19 holes of a planned program of more than 1800 metres of drilling on their MC and Masst claims (59). Results released to date include several intersections of 1 to 3 metres assaying 1.0 to 31.3 grams per tonne gold. Other companies active in this area include Masst Resources, Noranda and Minequest.

Gold in Triassic Black Phyllites: Eureka Rsources Inc. continued work on the Frasergold property (60) with a modest program of trenching and large-diameter reverse circulation drilling followed by a program of 1500 metres of diamond drilling. Possible reserves of 3.6 million tonnes grading 3.1 grams/tonne gold, including 600 000 tonnes averaging 7.8 grams/tonne gold have been outlined, with potentially much larger tonnages at a lower cutoff grade. Current efforts are directed towards outlining mineralization of sufficient grade and continuity for either bulk mining or small-scale underground mining. Mt. Calvery Resources Ltd. began trenching other black phyllite targets in the Spanish Mountain area, after Teck Corporation dropped its option on the CPW property (61).

Gold in Quartz Veins and Sulphide Replacements: Imperial Metals Corporation returned to the Cariboo Hudson mine (62), obtaining good results from over 2100 metres of drilling. Extensions to the known mineralization were found on both the Shasta and the 605 veins and further drilling is planned for 1987.

Transitional Porphyry-Volcanogenic Massive Sulphide Deposits: Interest in this type of precious metal deposit has increased sharply since the discovery of the QR deposit (63) by Dome Exploration (Canada) Ltd. in stratabound massive sulphides spatially related to an alkalic stock. Exploration targets are zones of alteration, especially propylitic alteration, in basaltic volcanics and related volcaniclastic sediments which have anomalous gold content, and are also close to dioritic or alkalic intrusions. Companies exploring for this type of mineralization included E&B Explorations Inc. with 21 holes planned on the Cariboo-Bell gold-copper deposit (64) and 28 holes planned for the Cariboo property east of the QR deposit. Dome had a small follow-up drilling program on their Bullion Lode property (65) as well as two drilling programs on the QR. The second program of 2500 metres was to follow up encouraging results from drilling between the Main zone and West zone earlier in the year.

Sediment-hosted Base Metal/Silver Deposits: Newmont Exploration of Canada Limited, Teck Corporation, Cominco Ltd. and Noranda Exploration Ltd. were active on claims staked largely as a result of the RGS releases, with programs of geochemistry, geophysics and mapping. Noranda in particular had follow-up programs on several properties in the Bowron River valley and east of the Rocky Mountain Trench on Cushing Creek.

Epithermal Precious Metal Deposits: Lac Minerals Ltd. continued work on its Bob property near Nazko (66). Twenty holes drilled on coincident induced polarization and anomalous soil precious metal targets in Cretaceous sandstones and quartzites, near the Tertiary and Recent volcanic centres, yielded some fair to good intersections. Additional induced polarization anomalies were identified and further drilling is planned.

Many junior companies were active elsewhere in the Cariboo. Areas of productive placer gold deposits in the Quesnel trough were particularly favoured.

Activity in the western part of the Omineca Mining Division was down sharply compared to 1985, with interest again being further north in the Toodoggone camp. Noranda drilled six holes on six properties. Imperial Metals drilled 17 holes on its Takla precious metal property (67), with encouraging results. A vein system in Takla Group volcanics was tested over a strike length of 700 metres and several intersections averaging 9 to 10 grams/tonne gold over widths of 1.5 to 2 metres were obtained. Another possible vein system was identified by soil geochemistry and will be drill-tested in 1987.

In the eastern Omineca Mining Division, Cominco continued to explore their Aley niobium-bearing zoned carbonatite (68). Extensive drilling and trenching programs have identified seven mineralized zones, in or near the amphibolitic margin of this large carbonatite, with some niobium-bearing mineralization also discovered in the core zone.

PLACER

Although the total number of placer programs remained about the same, there was a notable increase in testing programs compared to 1985, and recreational programs remain popular.

PRODUCERS

Blackdome Mine (69) (Au, Ag) - commenced full production on 15 May 1986 at 180 tonnes per day. The deposit is a classic bonanza-type gold quartz vein deposit in Eocene calcalkaline volcanic rocks. Current ore reserves exceed 200 000 tonnes containing 25.4 grams gold and 96 grams silver/tonne. Annual production is expected to be approximately 1400 kilograms of gold and 6000 kilograms of silver.

Endako Mine (70) (Mo) - following the purchase of surplus power under the Industrial Electricity Rate Discount Act, the Endako mine was reopened in August 1986 following a five-year shutdown. Annual production, at about one-third capacity, is expected to yield 3800 tonnes MoS_2, 40 per cent of which is destined for specialty markets. Reserves are approximately 140 million tonnes grading 0.143 per cent MoS_2.

Gibraltar Mine (71) (Cu, Mo) - Gibraltar continued to mill at a rate of 40 000 tonnes/day. Drilling, financed in part by a FAME grant, encountered significant mineralization in two of three target areas close to the present minesite, but the grade is marginal at current metal prices. Acid leaching of the No. 1 dump began in later summer and the electrowinning plant produced the first copper from the leachate on 7 October. The plant capacity is 14 tonnes of copper per day.

Mosquito Creek Gold Mine (72) (Au) - this mine closed again after milling some stockpiled ore. A major program comprising over 320 metres of drifting and 2200 metres of underground drilling, followed by down-the-hole geophysical surveys, failed to find sufficient ore to warrant reopening the mine. Underground exploration continues on a reduced scale.

Frenier Mine (73) (perlite) - Aurun Mines Ltd. improved the access road to their quarry and mined 2100 tonnes of perlite. Installation of a new expander, completed during the year, is expected to result in increased production in 1987.

Microsil (74) (diatomite) - there was no production from the quarry this year, but processed absorbents were sold from stock.

Boss Mountain (75) (Mo) - the mine passed from "moth-balled" status to permanent closure late in 1986.

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INTRODUCTION

The level of coal exploration and development was once again lower in 1986 with total drilling (exploration and development) decreasing to 50 500 metres from 65 800 metres the previous year. Exploration activity was restricted to one company, Quintette Coal Ltd., which submitted all four notices of work for the area. This compares with eight notices of work from four companies in 1985. Total exploration drilling amounted to 9372 metres (86 drill holes) compared to 11 842 metres (124 drill holes) in 1985. The division between exploration and development drilling has become rather arbitrary as all drilling was within or near active mining areas. The single most important development in 1986 was the opening of the Shikano pit by Quintette.

COAL EXPLORATION

A summary of exploration statistics is presented in Table 1.

QUINTETTE COAL LTD.

The Shikano and Hermann Gething deposits were the focus of Quintette's 1986 efforts outside the main pit areas (Figure 4.).

SHIKANO (76)

Thirty-seven rotary holes on a 50-metre spacing were drilled into the deposit, confirming structure. Total drilling now stands at 159 holes. Initial pit development began in October and it is expected that the deposit will supply 13 million tonnes of product coal. The coking quality of one seam (J) is of concern.

HERMANN GETHING (77)

The coals of economic interest are found in the Gething Formation, rather than the Gates Formation. Drilling of 37 rotary-drill holes and one diamond-drill hole in this deposit has extended the area known to be underlain by seams GT1 and GT2 to the northwest where folding and faulting complicate the structure. The two seams comprise 6 to 6.5 metres of coal occurring in the lower Gething Formation, about 45 metres below the Gething marine tongue. Results of a 15-tonne bulk sample indicate the coal is low in ash and volatiles and of marginal coking quality. Reserves are in the order of 1 to 3 million tonnes.

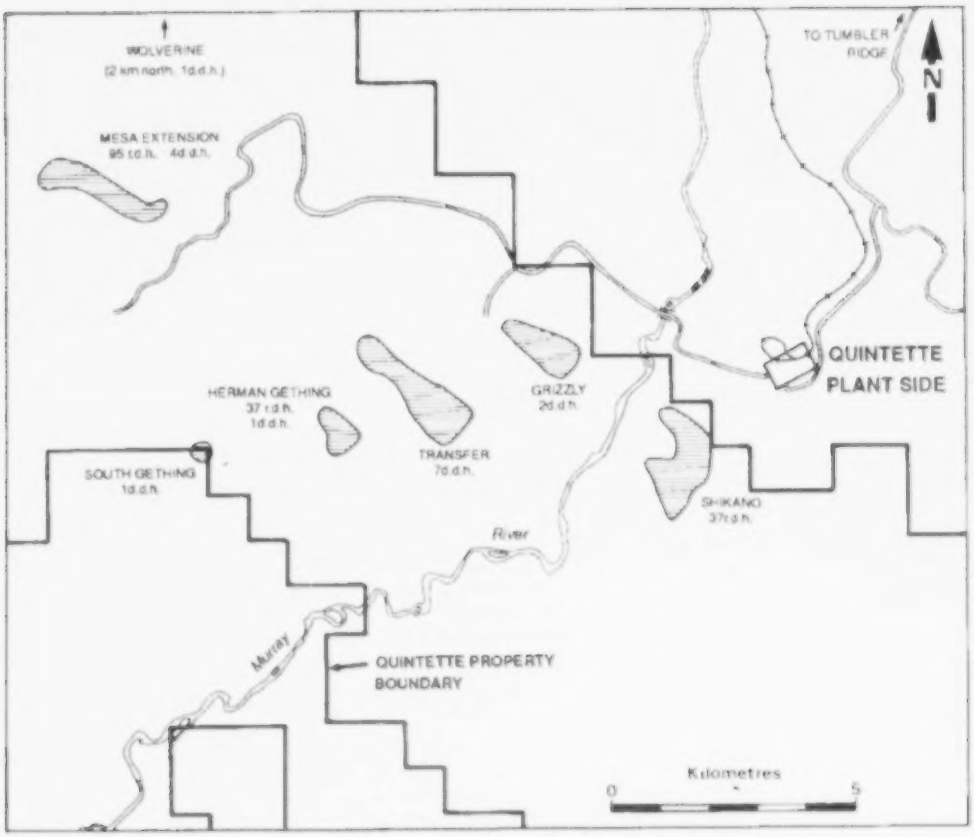

Figure 4. Quintette Coal Ltd., areas of 1986 exploration.

SOUTH GETHING (78)

One drill hole provided stratigraphic information on the lower Gething Formation section.

TRANSFER, GRIZZLY (79, 80)

The Transfer and Grizzly areas are adjacent to the conveyor belt and lie between the Shikano and Mesa pits. A total of nine diamond-drill holes was bored confirming that two of six mineable seams are not well developed. However the total mineable thickness (>12 metres) and the location of the deposits is sufficiently significant that a major geological program has been proposed for the area in 1987. The company hopes to bring the area to a mining permit stage by the end of next year.

WOLVERINE (81)

One drill hole tested a little-known area north of the minesite, near Mast Creek. There was a good (7 to 8-metre) intersection of the J seam but reduced thicknesses for the overlying seams.

DEVELOPMENTS/PRODUCERS

Both the Quintette and Bullmoose mines reduced coal production this year due to contract readjustments. Quintette will produce 5.0 million tonnes of metallurgical coal in the 1986 calendar year with 80 to 85 per cent of the production from the Mesa (McConkey) pit and 15 to 20 per cent from Wolverine. Some production will come from Shikano in 1987.

Development and production drilling totalled 35 084 metres in seven pits in 1986, compared to 47 994 metres in 1985. A large part of the drilling (20 938 metres in 95 rotary-drill holes and four diamond-drill holes) was directed toward development of the Mesa Extension (82) area on the margin of the Mesa pit and below the Mesa thrust fault. A grant under the FAME program supported the diamond-drill program. Drilling has clarified structural details for the planning of bench cuts. Reserves in this structurally complex deposit are approximately 23 million tonnes (product coal).

Teck Corporation's Bullmoose mine (83) will produce 1.7 million tonnes product metallurgical coal in its contract year (April 1986 to April 1987). Five seams (A to E) are mined with about 60 per cent of production coming from the thick and extensive A and B seams. In-place reserves at the South Fork pit stand at 45 million tonnes. Development drilling as of October 31, 1986 totalled approximately 6000 metres in 250 drill holes.

SOUTHEASTERN DISTRICT

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INTRODUCTION

The number of mineral exploration programs in the district increased to 13 from 10 in 1985. These break down as follows: gold, six; base metals, three; gypsum, two; barite, one; and kimberlite, one. Most projects were either modest drilling programs or geophysical/geochemical surveys, and all were minor by provincial standards.

The level of coal exploration was down significantly from the already depressed level of the previous year. Projected total drilling of less than 21 000 metres contrasts with a total of approximately 30 000 metres in 1985. As in 1985, all coal exploration programs, with two minor exceptions, were carried out within or near current mine areas. Southeast coal exploration activity is summarized in Table 1; highlights are discussed below.

One large coal property changed ownership in 1986. Elco Mining Ltd.'s 50 per cent share of the Elk River property was acquired by Fording Coal. No exploration was carried out on the property in 1986.

COAL EXPLORATION

Fording Coal Ltd., with FAME support, drilled 20 rotary-drill holes and 3 diamond-drill holes, for a total of 6142 metres, on various parts of their holdings. All except four holes (787 metres) were drilled in the immediate area of the Fording mine (84) including Greenhills K-pit Extension, Greenhills South, Eagle Mountain and Mount Turnbull. The other four holes were drilled at Aldridge Creek (85) 15 kilometres north of the mine. The major target of Fording's programs was high-volatile coal. Results in some areas were better than expected.

Westar Mining Ltd. carried out two rotary drilling programs in the Greenhills mine area (87). Twenty-six holes, totalling 2340 metres, were drilled on the west face of the Greenhills Range, in order to assess this area in light of a proposed new mine plan. A high-volatile coal exploration program in the north part of the property was still in progress at the time of writing. This program, which has had encouraging results to date, was proposed specifically to take advantage of FAME funding. A total of about 7990 metres had been drilled in 50 holes, as of November 9, with seven holes remaining to complete the program.

Crows Nest Resources Ltd. is very encouraged by the results of its FAME-funded low-overburden-ratio coal exploration program in the Lower South pit, within Line Creek mine (86). A total of 2765 metres of rotary drilling had been completed to the end of October, with more

planned for later in the year. The diamond-drilling program on Burnt Ridge Extension (87), also funded by FAME, provided encouraging results.

COAL DEVELOPMENTS

There were no major new developments in the southeast coal mines in 1986. Mining of A-seam on Natal Ridge in Westar's Balmer mine area (88) was commenced, but this pit was inactive for most of the year. At Westar's Greenhills mine (87) a new area called Porter Creek was brought to production. This area contains primarily reserves of 7 and 10-seams.

COAL PRODUCERS

The coal industry in the southeast suffered another year of poor markets and reduced prices for both metallurgical and thermal coal. All mines experienced shutdowns during the year.

Byron Creek Collieries (89) reduced its workforce from 250 to 110, and its production rate from over a million tonnes to 650 000 tonnes/year. A new preparation plant was completed this year, allowing the processing of stockpiled high-ash coal.

Layoffs were also implemented at Balmer, Greenhills and Line Creek mines.

The overall production rate at Line Creek mine (86) has been reduced from 2.0 to 1.6 million tonnes/year. A four-month labour dispute at Balmer mine (88) will result in decreased annual production for 1986. Production at the Greenhills mine (87) will be about the same as in 1985, while Fording mine (84) will exceed its 1985 production and have its most productive year to date.

The last underground coal mine in southeastern British Columbia ceased operation in 1986. The Balmer North mine in Westar's Balmer mine area (88) closed in February. Although underground coal mining had contributed only a small component of total coal production in recent years, this closure still represents the end of an era.

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INTRODUCTION

There were 191 active mineral exploration projects in the district during 1986, an increase of 24 per cent over the previous year. Exploration expenditures were much higher than last year, due to the greater number of drilling programs, mostly on precious metal prospects.

Significant new mineral finds have been made by Granges Exploration Ltd. on the Goldfinch claim group (90) near Camborne, held under option from Windflower Mining Ltd., and by Mikado Resources Ltd. and Turner Energy & Resources Ltd. on their Abbott claim (92) east of Trout Lake.

Esperanza Explorations Ltd. shipped 3420 tonnes of gold ore from the Tillicum property (93) for custom milling and have discovered high-grade gold mineralization on a new level below the "Money Pit" Northair Mines Limited completed a major underground diamond-drilling program on the Aylwin Creek property (95) south of New Denver; further development work is planned. Near Greenwood, Skylark Resources Ltd. and Viscount Resources Ltd. continued underground development work on the Skylark-OB property (104).

EXPLORATION

In the Lardeau area Granges Exploration Ltd. has made a new gold discovery on the Goldfinch claim group (90) northeast of Camborne. A zone containing at least two parallel veins has been traced by diamond drilling over a strike length of 400 metres and is currently being extended to the north. The best intersection reported to date returned 25 grams/tonne gold over a core length of 10.2 metres and included 1.5 metres grading 147.4 grams/tonne. An assay of 262 grams/tonne gold over 20 centimetres has been obtained in another hole; both intersections contained visible gold.

Also in the Lardeau, Mikado Resources Ltd. has discovered a polymetallic replacement deposit in the Badshot limestone on the Abbott claim (92) held jointly with Turner Energy & Resources Ltd. Drill-indicated reserves on the Abbott claim are estimated by the company at 45 000 tonnes grading 75.2 grams/tonne silver, 0.85 gram/tonne gold, 28.4 per cent lead and 16.6 per cent zinc. Mineralization in the outcrop is sufficiently high grade to be considered "direct-shipping ore". On the neighbouring Wagner property (91) Mikado also completed 25 metres of underground development work and seven diamond-drill holes.

In the Slocan mining camp, diamond drilling by Noranda Exploration Company Ltd. at the LH property (96), is reported to have intersected a wide zone of silicified agglomerate and tuff with two gold-bearing zones averaging 5.9 grams/tonne gold and 11.3 grams/tonne gold over 2.6 metres and 14 metres respectively. Mr. Alex Strebchuk continues to find visible gold in skarn and a narrow tension vein on the Caribou property (94) at Hailstorm Mountain; he has driven an adit 7 metres along the vein and hand-picked ore carrying visible gold.

In the Nelson area Ryan Exploration Company has continued its program of reverse circulation drilling on the Star claim (98). Gold values occur in a breccia zone at the contact of the Nelson batholith and Rossland volcanic rocks. Snowwater Resources Ltd. is diamond drilling a quartz vein discovered in January on the Referendum mine property (99) near Nelson. Lacana Mining Corporation has relinquished its option on the Kena claims (100) after completing 3049 metres of diamond drilling to test a silicified zone in volcanic rocks of the Rossland Group. Gold is present but continuity of values could not be established.

Near the International Boundary, Golden Eye Minerals Ltd. has completed 2692 metres of diamond drilling in six holes on the Red Bird deposit (101) and has intersected an extension of the mineralized zone 600 metres below surface. Assays of 10 per cent combined lead-zinc are reported, largely in oxidized material.

In the Fairview Camp, Longreach Resources Ltd. has completed 1280 metres of diamond drilling on the Platinum Blonde claim group (102). Intersections carrying platinum values have been reported and further drilling is planned.

Consolidated Boundary Exploration Ltd. has completed diamond drilling programs at the Golden Crown and Winnipeg mines (105) and on the Hek and Hel claims (106) in the Greenwood Camp.

DEVELOPMENT

MINERALS

In the Slocan mining camp, Esperanza Explorations Ltd. shipped 3420 tonnes of gold ore from Tillicum Mountain (93) for processing at the Robert's Mill in Greenwood. The shipment returned 27 grams/tonne gold representing 93 per cent recovery and indicating that the run-of-mine grade is higher than predicted from diamond-drilling results. Exploration drilling totalled 611 metres from surface and 171 metres underground. A new level below the "Money Pit" has opened up a high-grade oreshoot; drilling below the level indicates continuity. Plans for installation of an on-site mill with a minimim capacity of 90 tonnes/day are under consideration.

A total of 5233 metres of underground diamond drilling was completed on the Willa East zone at Aylwin Creek (95) by Northair Mines Limited. This zone appears to be down-faulted relative to the West zone,

allowing the possibility that better grades may be found at depth. Plans are in hand to drift 300 metres on the West zone to provide access for delineation drilling and a bulk sample for metallurgical testing. Acquisition of a pilot mill is also under consideration. Drill-indicated reserves in the West zone are currently estimated by the company at 849 400 tonnes with an average grade of 5.49 grams/tonne gold and 0.82 per cent copper. Reserves in the main or Willa zone were similarly estimated last year at 3.4 million tonnes with an average grade of 1.48 grams/tonne gold, 4.8 grams/tonne silver and 0.32 per cent copper.

At the Union mine (103) north of Grand Forks, Sumac Ventures Inc. (formerly Summit Ventures) continued development raising to block out ore below previously mined stopes. Assays from one mineralized shoot are reported to average 17.6 grams gold and 634 grams silver per tonne over a strike length of 9 metres and a width of 90 centimetres. A raise from 4 level intersected the Union vein some 40 metres below the old workings; assays averaged 15 grams gold and 610 grams silver per tonne, over a true width of 1.6 metres. Diamond drilling is in progress to test for vein extensions above existing stopes.

Development work by Skylark Resources and Viscount Resources at the Skylark-OB property (104) has focused on a narrow vein containing very high-grade native silver mineralization. Work completed includes a 78-metre decline, a 9-metre crosscut, 55 metres of drifting and a 15-metre raise. Surface work included 427 metres of reverse circulation drilling.

PLACER

Queenstake Resources Ltd. has excavated 15 metres to bedrock over a large area on Placer Leases 1773 and 1775 in the Moyie River area (107). Fair gold values are reported from the bottom 3 metres of gravel. Extensive upstream testing is planned before extending the pit.

PRODUCERS

Production (1985) from the Sullivan mine (108) of Cominco Ltd. totalled 2.397 million tonnes of ore with an average grade of 4.1 per cent zinc, 5.1 per cent lead and 57.4 grams/tonne silver.

Production (1985) from the Silvana mine (97) of Dickenson Mines Limited totalled 22 693 tonnes of ore with an average grade of 648.2 grams/tonne silver, 6.59 per cent zinc and 9.37 per cent lead. A total of 2896 metres of underground diamond drilling was completed.

SOUTH-CENTRAL DISTRICT

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INTRODUCTION

The focus of exploration in south-central British Columbia was again on precious metal deposits. Targets include epithermal and mesothermal vein and replacement deposits such as those in the Gold Bridge camp, skarn deposits as at Hedley, and polymetallic massive sulphides in the Adams Plateau area. Metallic mineral exploration increased moderately in 1986, while placer activity fell back slightly to 1984 levels. Several companies are drilling targets discovered by grassroots exploration carried out within the last five years, such as the Bonaparte property (133), while others are re-evaluating old properties such as the Stemwinder (148). Projects at an advanced stage of exploration include the Rea-HN (125), Congress (114), J & L (134) and Lumby (136) properties. British Columbia will have a new major gold producer when Mascot Gold Mines Limited begins production at the Nickel Plate mine (144). The projected start-up date is mid-1987 and construction is currently slightly ahead of schedule.

EXPLORATION

GOLD BRIDGE CAMP

The Gold Bridge camp continued to receive attention from a number of companies. Levon Resources Ltd. is currently drifting on the Howard zone at the Congress property (114), following a program of surface drilling and trenching. Indicated reserves as of November 1986 are reported by the company at 607 500 tonnes with an average grade of 8.2 grams/tonne gold; slightly less than half this amount is contained in the Howard zone. The ore is localized on stratigraphic or intrusive contacts complicated by three episodes of faulting. The resulting oreshoots are steeply plunging pods within broader zones of alteration and low-grade mineralization. Eight zones have been recognized to date, the most significant being the Howard, Lou and Congress zones. Sixteen drill holes, totalling 2591 metres, tested the Lou zone over 60 per cent of its 900-metre strike length; four holes intersected mineralization reported to assay greater than 10.6 grams/tonne gold over widths of 2.0 to 3.4 metres. Similar assays were obtained from two of the five holes drilled on the Extension zone. Metallurgical testing indicates that direct cyanide leaching is economically feasible on the surface gossan ores and will achieve 85 per cent gold recovery; vein ores require a preleach bacterial treatment, but 95 per cent recovery is attainable.

Soil sampling and trenching on Levon's BRX property (115) led to the discovery of six new veins and also extended the Rand, Joni and California veins.

Normine Resources Ltd. has been exploring for the extension of the Bralorne-Pioneer vein system on the Pacific Eastern property (116). Two holes were drilled to depths of 823 and 623 metres this year. One tested a previously unexplored area south of Cadwallader Creek and, at a depth of 365 metres, intersected the quartz diorite complex which hosts economic veins at the Pioneer mine. A 238-metre intersection of carbonatized diorite and quartz diorite, also known as "soda granite", contains more than 25 quartz veins ranging from 2.5 to 76 centimetres in width. Several veins are sheared, banded, or ribbon-textured, and contain pyrite or arsenopyrite. More detailed drilling will be required to test this favourable geological setting.

No work was done on the Bralorne mine in 1986 as Mascot Gold Mines Limited concentrated its efforts on the Nickel Plate project. Further south along Cadwallader Creek, Trans-Atlantic Resources Inc. and Armeno Resources Inc. conducted a drilling and surface exploration program on the Standard property (117). They tested several mineralized and silicified zones first explored in the 1930s when the No. 2 zone was sampled in a crosscut 45 metres below surface and reported to assay 4.3 grams/tonne gold across a width of 21 metres (Minister of Mines Annual Report, 1933, page A273). Eighteen holes, totalling 2200 metres, were drilled in 1986 to test five areas of anomalous gold in soils and outcrop. The Upper Piebiter showing has a surface expression 100 metres long by 25 metres wide; the average grade of surface samples is 1.4 grams/tonne gold. Drilling tested the zone over a strike length of 600 metres and obtained several mineralized intercepts assaying 0.3 to 2.4 grams/tonne gold over core lengths of 15 to 35 metres.

On the Anderson Lake property (118) X-Cal Resources Ltd. explored for Pioneer-type veins on the inferred southeast extension of the Cadwallader fault. The company also drilled two showings on the Pilot shear and is dewatering the old Pilot mine (113) where assays of 10.3 grams/tonne gold have been reported from the sheeted vein structure.

Esso Resources Canada carried out a comprehensive surface exploration program on the Hon (109), An, Bluff (110) and Big Creek (111) properties in the Tyaughton trough northwest of Gold Bridge. The target is gold-silver mineralization, similar to that at the Taylor-Windfall mine and spatially related to the Tchaikazan fault, a major break on strike with important structures in the Bralorne camp. Cretaceous Kingsvale volcaniclastic rocks on the claims are intensely altered and silicified; the alteration assemblage includes alunite, pyrophyllite, kaolinite and sericite and is typical of epithermal systems.

ADAMS LAKE AREA

The level of activity in the Adams Lake area increased this year; several junior and major mining companies explored for polymetallic massive sulphide deposits or gold-bearing iron formations. Late in 1985, Corporation Falconbridge Copper discovered the Silver zone 800 metres northeast of the Discovery zone on the Rea-HN property (125), optioned from Rea Gold Corporation. As of October 1986, significant disseminated

and massive sulphide mineralization, with an average width of 2.7 metres, had been traced for 700 metres along strike and 100 metres down dip; the zone is open in all directions. Reserves are currently estimated by Rea Gold at 1.02 million tonnes with an average grade of 1.4 grams/tonne gold, 727.5 grams/tonne silver, 2.89 per cent zinc, 3.20 per cent lead and 1.16 per cent copper. Spectacular high-grade mineralization, with values ranging up to 2850 grams/tonne silver and 20 per cent combined lead-zinc, occurs in some trenches and drill holes. Mineralization lies along the contact between chert and tuffaceous sediments within the Eagle Bay Formation. Rea Gold Corporation continues to drill the original Discovery zone and has added to reserves. Drill-indicated reserves, contained in the L97, L98 and L100 ore lenses, were estimated by the company in July 1986 at 242 870 tonnes averaging 6.5 grams/tonne gold, 73.3 grams/tonne silver, 2.25 per cent zinc, 2.14 per cent lead and 0.53 per cent copper.

On the adjoining Kamad property (126) Esso Resources Canada drilled 11 holes, totalling 1814 metres, on targets outlined by detailed surface work. The Kamad 7 occurrence, identified by drilling in 1985, lies on strike with the Rea Gold Discovery zone; drill-indicated reserves are reported at 45 000 tonnes of high-grade gold-silver-lead-zinc mineralization. The Rea Gold sulphide zones have also been identified on the Twin claims (127) optioned by Esso in November 1986. The claims are located immediately east of Kamad and south of the Rea-HN properties. Coincident geophysical and multi-element geochemical anomalies have outlined targets up to 600 metres long with up to 1400 parts per billion gold in soils.

Falconbridge Copper also carried out surface work on the Bar (123) and Chu Chua (122) claim groups and drilled at Chu Chua where the target is a chert-argillite horizon with disseminated to massive zones of pyrite and pyrrhotite mineralization. Other companies drilling volcanogenic massive sulphide targets in the Eagle Bay and Fennell Formations include Noranda Exploration Company Ltd. at Birk Creek (124), Aurun Mines Ltd. on the Hail-Harper Creek property (120) east of Chu Chua, and Newmont Exploration of Canada Ltd. on the Reg (121) and Water (119) claims to the north.

Rea Gold Corporation (in a joint venture with Verdstone Gold Corporation) discovered several new lead-zinc showings on the CK property (130), located 47 kilometres northeast of Clearwater. Previous drilling outlined the "New Showing," a zone of stratabound disseminated sulphides estimated by the company to contain 1.49 million tonnes grading 8.6 per cent zinc, 1.4 per cent lead and 8.6 grams/tonne silver. Trenching in 1986 exposed additional high-grade zinc mineralization to the south.

BONAPARTE LAKE AREA

North of Kamloops Lake, Placer Development Limited drilled 22 holes on the Precisely property (112) to test the Bridge zone. Seven holes returned anomalous gold values; the best intersection was 24.7

grams gold and 144 grams silver per tonne over a 60-centimetre intercept. Drilling resumed in the fall to test a geophysical target north of the Bridge zone.

One interesting development this year is the discovery of gold-quartz veins by Minequest Exploration Associates Ltd. on the Bonaparte property (133) 80 kilometres north of Kamloops. Five clusters of angular to subrounded boulders were outlined in 1985 by detailed prospecting to follow up heavy mineral anomalies in stream sediments. Samples from the boulders assayed from ten to several hundred grams per tonne gold. The property is underlain by locally pyritized Mesozoic and Paleozoic pelites and argillites intruded and hornfelsed by a Mesozoic quartz diorite stock and dyke swarm. All the rocks are cut by numerous quartz veins up to a metre in width and variably mineralized with pyrite, chalcopyrite, pyrrhotite, molybdenite, rare bismuth tellurides and free gold. The company drilled one target early in 1986 and intersected an 85-centimetre quartz vein, similar to the high-grade float, assaying 36.7 grams/tonne gold. Significant gold values are confined to specific veins. An on-going program of trenching and drilling is following up these results. In March 1986 the Province of British Columbia released a large area of the Bonaparte Plateau previously withdrawn from staking. Minequest subsequently staked an additional 224 claim units and have extended exploration northwest of the Discovery zone.

OKANAGAN-REVELSTOKE AREA

On the Brett claims (135) near Vernon, Huntington Resources Inc. drilled 16 holes, totalling 792 metres, to test epithermal gold-silver mineralization. Reported intersections include 9.1 and 6.0 grams/tonne gold over 4.6 and 3.4 metres respectively. The gold is present in veins and shears and also appears to be disseminated in permeable pyroclastic beds.

Quinto Mining Corporation is exploring for new reserves at the Lumby mine (136) east of Vernon. Diamond drilling completed in July intersected anomalous gold values in 19 holes, over a strike length of 1300 metres and extending 300 to 700 metres down dip. Trenches on this zone exposed mineralization averaging 5.8 grams/tonne gold over widths of 6 to 10 metres together with silver values up to 340 grams/tonne. The mineralization is localized in the contact zone of a diorite stock intruding volcanic and sedimentary rocks of the Nicola Group. The gold is associated with disseminated sulphides in zones of sugary quartz contained within a contact alteration zone 20 to 40 metres wide.

Brican Resources Ltd. drilled eight holes on its Top claims (137) in the Monashee Pass area; the target is fault-controlled epithermal gold-silver mineralization of Tertiary age. Noranda Exploration continued its evaluation of the J & L prospect (134) northwest of Revelstoke. Four composite samples of lead-zinc-silver-gold ore, from 29 underground sites, have been shipped for metallurgical testing.

Two old mining camps in the Osoyoos area are being re-examined. In the Fairmont camp, near Oliver, Highland Valley Resources Ltd. is drifting on the Stemwinder vein (148) which, in the past, produced 96 kilograms of gold and 530 kilograms of silver from 27 700 tonnes of ore. Drilling by Cominco Ltd. and Asarco Exploration Company of Canada Ltd. between 1982 and 1984, outlined reserves of 640 000 tonnes grading 3.8 grams gold and 51.4 grams silver per tonne in the Main vein and an additional 185 000 tonnes averaging 9.2 grams gold and 103 grams silver per tonne in the North veins. Current work is concentrated on the North veins where 305 metres of drifting were completed this fall. Camp McKinney (149) is being re-evaluated by Ark Energy Ltd. which is dewatering and rehabilitating the old workings on the Cariboo-Amelia vein which was mined periodically for precious metals between 1894 and 1962. Drilling below the sixth level is planned.

PRINCETON-HEDLEY AREA

Activity in the Hedley camp was highlighted by Mascot Gold Mines' production decision on the Nickel Plate property. Elsewhere Shangri-La Minerals Ltd. has had encouraging results on the Yuniman property (147) southeast of Nickel Plate, intersecting 5.2 metres averaging 4.2 grams/tonne gold in its first hole. Work is focused on the Bush Rat shear zone and the Black Pine quartz stockwork. There are also gold-bearing scapolite skarn showings on the property.

Placer Development Ltd. intersected sulphide-bearing skarn carrying gold values in several holes on the Canty mine property (146) owned by Golden North Resource Corporation, but has since relinquished its option. The best intersection reported was 3.0 metres of 9.3 grams/tonne gold. Golden North has reported drill-indicated reserves of 689 000 tonnes grading 3.7 grams/tonne gold. Mascot Gold Mines has now taken over as operator on the property.

Noranda Exploration drilled 11 holes on the Pine Knot claims (142). High gold assays were obtained from five holes; visible gold is present in carbonaceous stringers within an altered quartz diorite. On the Cahill claims (145), owned by Consolidated Sea Gold Corporation, a fall drilling program is centred on an earlier hole which obtained two mineralized intercepts assaying 3.6 and 8.5 grams/tonne gold over 2.7 metres and 90 centimetres respectively.

Candorado Mines Ltd. is evaluating the feasibility of recovering gold from the Hedley tailings (143) by heap leaching. Assays on 363 composite samples from 59 drill holes indicate a potential reserve of 1.54 million tonnes with an average grade of 1.4 grams/tonne gold. Preliminary metallurgical tests indicate that 70 per cent gold recovery can be achieved.

Worldwide Minerals Ltd. and Lone Jack Resources Ltd. have consolidated claims on Whipsaw Creek (141) and are carrying out a detailed evaluation of the property. Eight holes, totalling 940 metres,

were drilled in the winter of 1987-88 and five trenches were excavated this summer. Gold-silver mineralization is associated with disseminated sulphides in flat to gently dipping silicified fracture zones. At the Rabbitt mine, 27 kilometres northwest of Princeton, Twin Eagle Resources Ltd. and partners are drilling the southwest extension of the main Rabbitt vein (132). The mine produced a small tonnage of high-grade gold-silver ore between 1939 and 1941. Alermin Corporation has completed a program of soil sampling, trenching and other surface work on the adjoining Rabbitt claims (136). Huldra Silver Inc. has discovered a new zone of lead-zinc-silver mineralization on strike from the old workings on Treasure Mountain (140). Drilling and trenching have traced the vein over a strike length of 220 metres.

Several companies are staking and working platinum prospects in the Tulameen area, but no programs have yet reached the drilling stage.

DEVELOPMENT

Mascot Gold Mines Limited began construction this summer at the Nickel Plate mine (144), a potential world-class open pit gold mining operation and the first of its kind in the province. The company is aiming for a June 1989 start-up of the 2450 tonne/day concentrator and late this year was slightly ahead of schedule and under budget. Throughput is forecast at 12.1 kilograms (389 troy ounces) per tonne at an estimated cost of $US120 per ounce. Mining has begun in the central pit with ore stockpiled for future milling. Reserves are quoted at 6.4 million tonnes

Plate 5. Mascot Gold Mines Limited, view of mining and concentrating plant under construction across Osprey Lake in lower left corner.

grading 5.14 grams/tonne, with a stripping ratio of 8:1. A recovery rate of approximately 87 per cent is indicated by the feasibility study, but the company hopes to improve on this figure. Mascot continued drilling to test sulphide-bearing horizons adjacent to the pit and has intersected significant gold mineralization.

In the Shuswap Lake area, Killick Gold Company Ltd. shipped 3630 tonnes of lead-zinc-silver ore from the Mosquito King (129) and Silver Lichen (132) properties to its 27-tonne/day mill at Bowler Creek. Killick Gold is also developing the Pisima Mountain property (128) owned by Camber Exploration Company Ltd. Total broken reserves on the three properties are estimated by Killick Gold at 36 300 tonnes averaging 18 per cent combined lead-zinc, 140 grams/tonne silver and 2.4 grams/ tonne gold. The company is also experimenting with leaching techniques to treat gold-bearing iron formation. Nexus Resource Corporation is drilling a siliceous oxide-facies iron formation on its neighbouring Scotch claims (131).

PRODUCERS

In July 1986 Cominco Ltd. and Lornex Mining Corporation formed the Highland Valley Copper partnership to combine their assets in the Highland Valley. Higher grade ore from Cominco's Valley pit (151) will now be treated at the Lornex (152) mill. The resulting reduction in operating costs has already had a positive effect on earnings. A capital expenditure of some $83 million will be made over the next 18 months to increase mining and milling capacity to 109 000 tonnes per day and reduce unit costs to 50 cents (US) per pound of copper in concentrate. Two semimobile crushing plants, said to be among the largest in the world, are currently being installed in the Valley pit.

Teck Corporation continued to develop open pit reserves in the Pothook zone at the Afton mine (150) near Kamloops; the present pit has a life of two years.

Brenda Mines Ltd. (153) operated throughout 1986, increasing production of copper and molybdenum concentrates as a result of mining higher grade ore and improved metal recoveries.

The Similkameen mine (154) of Newmont Mines Ltd. and the Highland Bell mine (204) of Teck Corporation were operated continuously throughout 1986. At Highland Bell, a diamond-drilling program partially funded by a FAME grant, was successful in increasing reserves.

SOUTHWESTERN DISTRICT

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INTRODUCTION

Exploration activity in the Southwestern District during 1986, as measured by the number of projects reported, has decreased by 24 per cent compared to 1985. The reduction in activity has occurred uniformly throughout the district with approximately 60 per cent of the significant programs taking place on Vancouver Island, 28 per cent on the southwestern mainland, and the remainder on Texada and the Queen Charlotte Islands. The Sicker volcanic belt of Vancouver Island again attracted the highest level of activity although no major new discoveries have been reported since the success by Abermin Corporation and Laramide Resources Ltd. on the Lara property in late 1984.

Coal exploration has dropped dramatically from six projects in 1985 to only one reported in 1986. Placer activity in the Leechtown camp and near Hope has remained at about the same level as in 1985. There are two major producing mines in the Southwest District, Island Copper and the Myra Falls operations of Westmin Resources Limited. Small quantities of thermal coal were produced from two coal properties in 1986. There are no mines under active development at the present time, but the former Privateer mine at Zeballos and the Chute Creek coal property near Campbell River are undergoing early development work on a small scale.

Exploration targets of primary interest in 1986 continued to be polymetallic massive sulphide deposits and skarns where significant precious metal content has been demonstrated. Numerous precious metal vein occurrences were explored, with growing interest in those that appear to be epithermal in origin. There was increased activity in exploration for platinum group metals at the grassroots level, but so far no promising new projects have been reported which have platinum group metals as the main commodities of interest.

Highlight projects include the Lara polymetallic massive sulphide property west of Chemainus, where Abermin Corporation continues to add to the geological reserves in and around the Coronation zone. Kerr Addison Mines Limited is continuing to receive encouragement at the Abo gold prospect near Harrison Hot Springs. A late-season trenching and drilling program by Better Resources Ltd. at Mount Washington has attracted considerable attention as it has significantly extended the known gold-silver mineralization in Tertiary epithermal veins and breccias.

EXPLORATION AND PROPERTY DEVELOPMENT

Table 1 lists all those exploration and development projects in the Southwest District on which significant work is known to have been

done or is expected to be initiated in 1986. The map numbers listed in the table and shown in brackets after property names in the following text are keyed to the location map, Figure 2.

MINERAL EXPLORATION

VANCOUVER ISLAND

The major concentration of exploration activity in the district in 1986 has been in the Sicker belt of southern Vancouver Island, a package of Paleozoic volcanic and sedimentary rocks extending from Duncan to Port Alberni. The focus of attention within the belt continues to be the Lara property (161), west of Chemainus where the Abermin Corporation and Laramide Resources Ltd. joint venture is continuing to find more mineralization within and on strike with the Coronation zone, a zone of polymetallic massive sulphides hosted in felsic tuffs. Abermin expects to core about 11 000 metres in 1986, including a row of large-diameter holes in the Coronation zone for a metallurgical sample. No estimates of geological reserves have been published, but the operator has reported that mineralization has been found discontinuously over a strike length of about 1.6 kilometres in three discrete deposits averaging 0.8 per cent copper, 1.3 per cent lead, 6.2 per cent zinc, 113 grams/tonne silver and 5.1 grams/tonne gold over an average width of about 3.7 metres.

On property adjoining the Lara both on the west (Chip claims) and on the east (Holyoak claims) (162), Falconbridge Limited, in a joint venture with Esso Minerals Canada, has carried out extensive geological mapping, geophysics and trenching leading to diamond drilling late in the season. At Mount Sicker (160) north of Duncan, Corporation Falconbridge Copper completed 10 diamond-drill holes, totalling 2091 metres, early in the year and plan to do further drilling before year-end. Likewise, Utah Mines Limited is drilling late in the year at the JRM property (159) on Mount Brenton, after completing five holes totalling about 2000 metres in the spring. Falconbridge Limited completed geological mapping, geophysical and geochemical programs on both the West property (158) and the PF option (157) near Crofton. It plans to drill the PF property late in the year. The exploration targets on all of the previously mentioned properties are polymetallic massive sulphides in felsic volcanics of the Sicker Group, as found at Lara and the old Lenora and Tyee mines on Mount Sicker.

Elsewhere in the Sicker belt, the joint venture of Nexus Resource Corporation and Reward Resources Ltd. mapped and drilled several copper-zinc-silver-gold-bearing skarn deposits known collectively as the King Solomon property (156) south of Duncan. International Cherokee Developments Ltd. has assembled a property comprised of five contiguous claim groups stretching from the Chemainus River to Cowichan Lake (163). Preliminary geological and geochemical work, partly joint-ventured with Nexus Resources and Vanwin Resources Corporation, is reported to have delineated copper and gold anomalies in felsic volcanic rocks, and drilling is planned. Utah Mines Limited continued systematic surface exploration of its very large Striker property (164) north of Cowichan Lake. On the

Heather property northwest of Cowichan Lake (165) Corporation Falconbridge Copper, with participation by International Cherokee, completed geological mapping and other surface surveys and drilled five holes totalling 548 metres. On Haslam Creek (178) west of Ladysmith, Imperial Metals Corporation drilled one 64-metre hole to test a geophysical-geochemical anomaly in the upper sedimentary part of the Sicker Group.

Nexus Resource Corp. carried out systematic mapping, geophysics and geochemistry, to be followed by drilling, on the Kitkat property (166) in the Nitinat River area. Work in 1985 located showings of stratabound polymetallic mineralization in Sicker volcanic rocks and detected geochemically anomalous platinum, palladium, copper, nickel and chromium in magmatic sulphide concentrations associated with the contacts of diorite intrusions. On the adjacent Raft property (167) Vanwin Resources has also indicated its intention to drill, following geophysical surveys and geological studies of a reportedly large multi-element geochemical anomaly. East of Port Alberni, the joint venture of Westmin Resources and Nexus Resources has waited until late in the year before starting two major programs in the Sicker belt. The Thistle property (168), centred on the old Thistle mine which produced over 6000 tonnes averaging 4.6 per cent copper, 13.4 grams/tonne gold, and 8.2 grams/tonne silver, will see more systematic surface studies and some diamond drilling. Several showings of massive sulphides occur in a mafic flow unit. Likewise several anomalous areas are to be explored and drilled on the nearby Debbie property (169) which extends from Lizard Lake to Stokes Creek near Port Alberni. Also in the Sicker belt, near Nanaimo Lakes, Canamin Resources Ltd. drilled seven short, vertical holes on their gold-bearing hematite showing at the Villalta property (179). The company has calculated drill-indicated reserves of 50 000 tonnes grading 5 grams/tonne gold which could be mined at surface. This enigmatic, flat-lying slab of hematite, which averages about 7 to 8 metres in thickness, appears to be a residual deposit formed where a Triassic(?) weathering surface has truncated an auriferous jasper horizon.

At Valentine Mountain (155) near Victoria, Beau Pre Explorations Ltd. conducted minor trenching, bulk sampling, mill tests and geological studies on its gold vein property in the Leech River complex, following termination of its agreement with Falconbridge Limited. Several prospectors were active in the southern part of Vancouver Island but, aside from Valentine Mountain, no significant projects are known to have been undertaken south and west of the Sicker belt.

On the Kola property (170) about 10 kilometres southwest of Port Alberni, the joint venture of Amstar Venture Corporation and Mariah Resources Ltd. reports having drilled more than 20 holes to test mineralized shear zones in mafic volcanics adjacent to a diorite intrusion. The best intersection assayed 5 grams/tonne gold, 83.65 grams/tonne silver and 8.5 per cent copper over a core length of 1.8 metres. Except for the activity of a handful of prospectors, the Kennedy River

gold camp was dormant in 1986, in contrast with its status as one of the "hot spots" two years ago. International Coast Minerals Corp. carried out geophysical surveys, mapping, trenching and bulk sampling on the United Bear group (171) where this author sampled a newly discovered sphalerite-pyrrhotite-bearing quartz vein in 1985 that assayed 42.2 grams/tonne gold across 2.7 metres and 254.4 grams/tonne gold across 0.5 metre. Late in the year, a joint venture was announced between Kerr Addison Mines Limited and International Coast Minerals on the United Tommy gold property located directly across the Kennedy River from the United Bear.

Cominco Ltd. completed some geophysical, geochemical and geological surveys on the Tofino Nickel property (172) and then returned the property to the owner. Magmatic sulphides containing ore grade copper and nickel with significant palladium, platinum and silver occur in irregular ultramafic intrusions in metamorphosed Sicker Group rocks. At the Cypress property (173), 13 kilometres north of Tofino, Utah Mines completed geophysical and geochemical surveys on an 80-kilometre grid over volcanic and sedimentary rocks believed to belong to the Sicker Group.

At Zeballos, McAdam Resources Ltd. is again drilling from surface to explore narrow, but locally high-grade, gold-bearing structures on the Spud Valley property (175). A successful drilling program in 1985 had located three new mineralized structures near the old Goldfield vein workings, where existing reserves are estimated at 390 000 tonnes grading 8.7 grams/tonne gold. The Thomson Gold property at Amai Inlet (176) was further examined and six holes, totalling 550 metres, were drilled in the vicinity of the old Fil workings. Taywin Resources Ltd. has completed extensive stripping and trenching preparatory to percussion drilling at the Electrum (Sin) property (177) at Malksope River where locally impressive gold and silver values are present in epithermal quartz veins and quartz stockworks. In January of 1986, Acorn Resources Ltd. drilled a gold-bearing shear zone system in Bonanza volcanic rocks at Restless Mountain (184) south of Winter Harbour.

A project which has attracted considerable attention in the latter part of 1986 is the Mount Washington property (180) where Better Resources Ltd. has conducted an aggressive program of trenching and close-spaced drilling and succeeded in demonstrating a probable connection between the gold and silver-bearing Lakeview vein-breccia zone and the Domineer vein on opposite sides of Breccia Ridge. Both zones are subhorizontal epithermal replacement features which contain gold values ranging from 3 to 15 grams/tonne over widths of 1 to 5.5 metres. A single drill hole into the Murex breccia, approximately 3 kilometres southeast of the Domineer zone, intersected a mineralized diatreme breccia which assayed 5.93 grams/tonne gold over 15.9 metres. Late in the season drilling was continuing on both the Domineer and Murex zones. Immediately to the west, Iron River Resources Ltd. has found gold-bearing, Tertiary diatreme breccias and flat-lying vein-breccias, identical to those on Mount Washington, on the Joe Anne and Rina claims (181) near Divers Lake and along Piggott Creek. Noranda Exploration has optioned the property and has begun preliminary surveys.

TEXADA ISLAND

On Texada Island, Northair Mines Limited completed 13 drill holes totalling 270 metres on the Yew Crown grant part of the Holly property (185). A newly discovered, flat-lying magnetite skarn zone carries gold values averaging about 13 grams/tonne over less than a metre. At Surprise Mountain, Rhyolite Resources Inc. completed detailed geological mapping, geophysical surveys and trenching, and drilled 13 shallow holes on a property covering the three small former producers, Silver Tip, Nancy Bell and Tyee (187). The Silver Tip and Nancy Bell quartz-sulphide vein-shear structures average about 1 metre in width but have been shown to have considerable strike length and to carry erratically high gold, silver and zinc values. Vananda Gold Ltd. has acquired control of a large property, also named Vananda Gold (186), which covers most of the former copper and iron skarn producers in north-central Texada Island, including the Little Billie, Cornell, Copper Queen and Texada Iron mines. In 1986 Vananda systematically reviewed all of the old data and mapped the distribution of various skarn types in detail, prior to defining drill targets most likely to represent additional reserves of gold-bearing skarn. On the Sabine and Newt (188) claim groups at the southern tip of Texada Island, Esso Minerals Canada carried out geological mapping and other surface surveys over a package of volcanic rocks with small sulphide showings that has been previously mapped as Paleozoic Sicker Group.

LOWER MAINLAND

The currently most promising prospect in the southwestern mainland part of the district is the Abo (RN) property near Harrison Hot Springs (195), held under option by Kerr Addison Mines Limited. The target is large-tonnage, low-grade auriferous quartz vein stockwork in Tertiary quartz diorite intrusions. Work completed in 1986 has included a total of 1971 metres of drilling in 15 holes, as well as ongoing mapping and other surveys. Kerr Addison has announced an immediate start to a late-season program that will include additional drilling and possibly underground bulk sampling of one of the mineralized zones. Also in the Harrison Lake area, BP Canada Inc., as operator in a joint venture with International Curator Resources Ltd. and Chevron Canada Resources Ltd., drilled 28 holes totalling 2672 metres, on the T-zone at the Seneca (194) polymetallic massive sulphide property.

Newjay Resources Ltd. has issued press releases reporting a successful exploration program, including 13 percussion drill holes, on the Master Ace gold-silver property (196) east of Hope.

In the Indian River-Furry Creek area near Brittania (189), Corporation Falconbridge Copper is drilling on an extensive property optioned from Fleck Resources Ltd.; the target is polymetallic massive sulphides in felsic volcanics of the Cretaceous Gambier Group. Falconbridge Limited carried out preliminary surface mapping and geochemistry in a similar geologic setting on its Callaghan (Edna) property on Callaghan Creek (190).

At Lang Bay south of Powell River (191), Fargo Resources Limited completed refraction seismic surveys and drilled nine rotary holes totalling 300 metres on its germanium/gallium prospect. Mineralization occurs in flat-lying carbonaceous sandstone and lignite beds of late Cretaceous or Tertiary age. Samples from the rotary drilling are being used for metallurgical tests attempting to improve germanium and gallium recovery.

At the Alexandria gold property on Phillips Arm (192), Charlemagne Resources Ltd. has completed soil surveys and plans late season drilling. On the adjacent Doratha Morton property (193), Signet Resources Inc. drilled a total of 438 metres in six diamond-drill holes early in the year and has continued with additional stripping, trenching and bulk sampling.

QUEEN CHARLOTTE ISLANDS

Exploration activity on the Queen Charlotte Islands was at a very low ebb in 1986, with only two significant projects reported. At the Golden Dyke project (197) on Rennell Sound, Noranda Exploration carried out extensive geological mapping as well as IP and geochemical surveys, followed late in the season by a modest drilling program. The target is an epithermal precious metal deposit in a regional swarm of sheared and altered feldspar porphyry dykes which locally contain gold-bearing pyrite and stibnite mineralization. At the Crescent claim group (198) on northern Moresby Island, Goldenlode Resources Ltd. completed soil and rock geochemical surveys and detailed geophysics on a gold prospect. Late in the year, Consolidated Cinola Mines Ltd. announced plans to initiate a major drilling program designed to firm up reserve estimates on the Babe (199) epithermal gold deposit on Graham Island. This followed the announcement that City Resources (Asia) Ltd. had purchased a controlling interest in the company.

COAL EXPLORATION

The only coal exploration project reported in the Southwest District in 1986 involved reconnaissance geological mapping by Esso Resources Canada Limited on its newly acquired coal licences in the Quatsino Sound area of northern Vancouver Island (183). The purpose was to evaluate potential coal resources in the Cretaceous Queen Charlotte Group northwest and east of Winter Harbour.

DEVELOPMENT

There are no properties in the district that are under active development at the present time. However, New Privateer Mines Limited has continued to develop and sample underground workings on the 1100 level at the Privateer mine near Zeballos (174). The work is designed to clarify the ore reserve picture and experiment with milling procedures. On Texada Island, Rhyolite Resources Ltd. is reported to be constructing a small flotation mill near Vananda, to process gold mineralizaton from the high-grade zone on the Holly property, the Bolivar deposit and other gold

properties on the island. On the Chute Creek coal property south of Campbell River (182), Nuspar Resources Ltd. opened a 46-metre adit into one of the coal horizons and has applied for a permit to extract 150 tonnes of thermal coal.

PLACER ACTIVITY

Placer mining activity remained at about the same level as in 1985. In the Leechtown area of southern Vancouver Island there are two moderate-sized operations on the Sooke River and about nine smaller panning or sluicing operations on the Leech and Sooke Rivers or their tributaries. An indefinite but smaller number of placer operations are reported in the Fraser River valley upstream from Hope.

PRODUCING MINES

Table 2 provides details of the two major producing metal mines and two small coal producers in the Southwestern District.

The Myra Falls operation (200) of Westmin Resources Limited, at the south end of Buttle Lake, has continued in full production through 1986 with the new H-W mine and 2720 tonne/day mill now in full operation after opening in 1985. Copper, zinc, lead, gold and silver are produced from polymetallic massive sulphide deposits in rhyolite volcanic rocks of the Myra Formation. Combined proven and probable reserves for the H-W, Lynx and Price deposits were reported at the beginning of 1986 to be 11.95 million tonnes containing 2.4 grams/tonne gold, 40.1 grams/tonne silver, 2.56 per cent copper, 0.37 per cent lead, and 5.44 per cent zinc. Exploration on the property is ongoing and consists mainly of systematic underground drilling in the H-W zone resulting in steady improvement of reserves and structural definition of the H-W deposit. At the smaller Lynx mine, some exploratory drilling is being carried out ahead of development on the West "G" zone.

The Island Copper mine of Utah Mines Limited near Port Hardy (201) is continuing to produce and sell concentrates containing copper, molybdenum and gold from a porphyry deposit associated with a Jurassic quartz-feldspar porphyry dyke intruding Bonanza Group andesitic tuffs. The daily mill throughput is about 47 200 tonnes. Improvements in operational efficiency over the past year include modifications to the milling circuit and installation of a mobile crusher and conveyor belt system in the pit to move crushed ore directly from the pit-bottom to the mill. Drilling in the southeast corner of the pit in 1985 defined a substantial tonnage of additional ore-grade mineralization extending outside the design limits of the present pit. Geotechnical studies have been initiated to determine how the potential new reserves can be recovered. Exploration drilling of geological and geophysical-geochemical targets elsewhere on the mine property is continuing in an ongoing search for new ore zones.

Two coal properties produced small quantities of thermal coal for the local market in 1986. The Wolf Mountain mine (202) southwest of Nanaimo produced intermittently through the year at a rate of about 100 tonnes per day. At the Quinsam coal property (203) at Middle Quinsam Lake production of approximately 10 000 tonnes of coal for local use is expected this year; full development of a 910 000 tonne/year thermal coal mine remains on hold pending improved market conditions.

INDUSTRIAL MINERALS

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INTRODUCTION

The 1986 production levels of the traditional industrial minerals, aggregate, asbestos, gypsum, jade, limestone used for lime, cement and fillers, magnesite and silica, followed established patterns in 1986 and have not changed significantly from previous years. There are, however, several new developments which are outlined below.

ASBESTOS

Investigation of the underground McDame orebody at Cassiar (1)* continued during 1986 by extending the existing adit into the ore zone and by underground drilling.

BARITE

Due to the low demand by the oil and gas drilling industry the Kimberley operation of Magnesium Minerals was inactive in 1986, the Parson mine of Mountain Minerals Ltd. was shut down in August and the Silver Giant mine of Baroid of Canada Ltd. closed indefinitely. Bar-Well Resources Ltd. completed minor exploration work on its Elkhorn (2) property near Windermere.

BUILDING STONE

Production of flagstone from both Revelstoke (6) and Salmo (7) was reduced due to poor demand from Alberta customers. The CANROC processing plant in Delta reopened in September, after several months of shutdown, and is processing "coastal granite" from Nelson Island (3) and granite from Beaverdell (5) to produce flooring tile, facing stone and monument stone. Bellard Marble Inc. is producing "dark blue granite" on a small scale from its quarry on Knight Inlet (4) for use as monument stone.

NEW DEVELOPMENTS

A deposit of green slate at Dome Creek (8), near McBride, is being examined for roofing and flagstone applications.

CARBONATITES

Cominco Ltd. continued exploration of the Aley deposit (9) and reported significant niobium values. Rare earth minerals reported from this property are a curiosity with no commercial accumulations.

*Properties referred to in the text are keyed, by map number, to Figure 5.

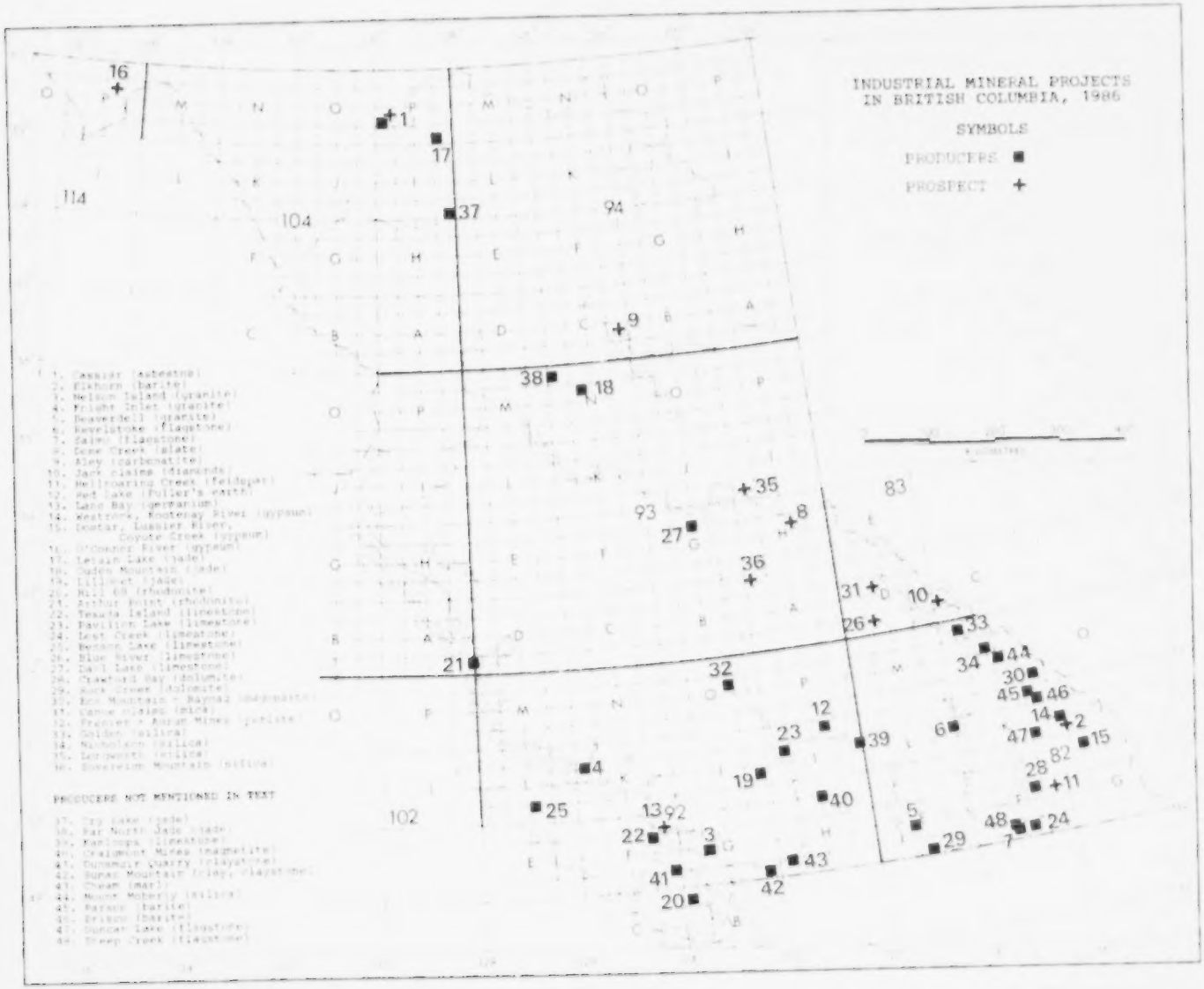

Figure 5. Selected industrial mineral projects in British Columbia, 1986.

DIAMONDS

Dia Met Minerals Ltd. of Kelowna is drilling the Jack diatreme (10) north of Golden. A microdiamond was reported from this property in 1985.

FULLER'S EARTH

The production of industrial and domestic absorbents from the Red Lake deposit (12) near Kamloops continued successfully during 1986. At present the operator, D.E.M. Resource Processors Ltd., is planning the construction of a larger processing plant to meet the increasing demand for its product.

FELDSPAR

NEW DEVELOPMENTS

Following CAMROC's unsuccessful attempt to develop a feldspar deposit near Boston Bar in 1985, Bearcat Explorations Ltd. is re-evaluating its beryllium prospect at Hellroaring Creek (11) near Kimberley as a feldspar deposit. Bulk sampling and mineral processing studies were carried out during 1986.

GYPSUM

Both Westrock Industries Limited (14) and Domtar Inc. (15) produced gypsum from their properties near Windermere and Canal Flats. The O'Connor River deposit (16) in the northwestern part of the province was drilled by Queenstake Resources Ltd.

NEW DEVELOPMENTS

Domtar Inc. explored two deposits in the Lussier River (15) and Coyote Creek (16) areas and Westrock Industries evaluated the Kootenay River Claim Group (14).

SEMIPRECIOUS STONES

JADE

Exploration work was reported by Mohawk Oil Canada Ltd. at Letain Lake (17) and by Far North Jade Ltd. on Ogden Mountain (18). Both companies are established producers from these properties. Limited exploration on properties near Carpenter and Anderson Lakes in the Lillooet area (19) was carried out by individual prospectors.

RHODONITE

A small quantity of rhodonite processed into jewelry and souvenir carvings came onto the market from deposits at Hill 60 (20) near Duncan and from Arthur Point (21) south of Bella Coola.

GERMANIUM

NEW DEVELOPMENTS

Fargo Oil Corporation reported exploration drilling on its Lang Bay (13) germanium prospect south of Powell River.

LIMESTONE

With one exception, limestone production from Texada Island (22) and in the British Columbia interior continued during 1986 without significant changes. Canada Cement Lafarge Ltd. however, announced in July that the Vananda quarry on Texada Island will be shut down.

NEW DEVELOPMENTS

Ekaton Energy Ltd. of Calgary reported bulk sampling and testing of white marble from Blue River (26) near Clearwater for possible applications as a filler in the paper industry.

MAGNESITE

Production from the Baymag Mines Co. deposit (30) on Eon Mountain continued during 1986 at a similar rate as in the previous year.

MICA

There is renewed interest in the mica prospect near Valemount. Outland Resources Corp. reports reopening old trenches and bulk sampling the high-mica schist on the Canoe claims(31).

PERLITE

In the spring of 1986, Aurun Mines Ltd. began production from its new processing plant in Surrey. Production from the Frenier deposit (32), south of Gang Ranch, reached 3000 tonnes per year.

SILICA

Production of lump silica from Nicholson (34) and silica sand from Golden (33) proceeded as in previous years.

NEW DEVELOPMENTS

Consolidated Silver Standard Mines Limited reported positive results from the exploration work completed in previous years on silica properties on Bearpaw Ridge near Longworth (35), east of Prince George.

TALC

NEW DEVELOPMENTS

Trifco Minerals Ltd. reported exploration drilling and sampling on a talc deposit near Sovereign Mountain (36), 36 kilometres southeast of Quesnel.

GOVERNMENT STUDIES

Field activities in industrial minerals increased significantly compared to previous years. The results of eight field studies are reported in detail in Geological Survey Branch Paper 87-1, Geological Fieldwork, 1986. Topics covered include granite and marble dimension stone, olivine for foundry sand applications, carbonatites and ultramafic diatremes, phosphate resources and the industrial mineral potential of volcanosedimentary rocks in the Tertiary basins of southern British Columbia.

THE 'FAME' PROGRAM - FINANCIAL ASSISTANCE FOR MINERAL EXPLORATION

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INTRODUCTION

This $5 million program was announced by the Minister of Energy, Mines and Petroleum Resources on April 28. The first applications started to arrive on April 30 and by the end of June, a total of 661 grant applications had been received under the three components of the program. By the end of June grants were approved for 151 of the applicants, committing all the available funds. Progress on approved programs has been closely monitored and some re-allocation of funds was made in September as a few projects did not proceed to completion as originally forecast by the applicants. Most funded projects were inspected in the field by Ministry personnel. Initial results from FAME projects indicate exciting exploration results. An evaluation of whether the program has met its objective of stimulating exploration in the Province is on-going.

PROGRAM PROMOTION

A descriptive brochure was produced summarizing the aim and intent of the program, defining eligibility criteria and the maximum sizes of grants and including the necessary application forms. The initial printing of 4000 copies was distributed, at the end of April, to companies and individuals actively engaged in mineral exploration in the province as well as industry associations and Government District Offices. The high level of interest necessitated an additional printing of 2000 brochures, of which less than 200 remain on hand.

A descriptive press release was issued on April 28 which generated widespread public awareness of the program. A paid advertisement was placed in the Northern Miner. Favorable editorial comment has appeared in the Northern Miner, Mining Journal (UK), North West Prospector (US), North American Gold Mining News (US) and the Canadian Mining Journal.

LIAISON WITH INDUSTRY

Wide-ranging discussions were held with industry groups such as the British Columbia and Yukon Chamber of Mines and the Mining Association of British Columbia, prior to completion of program design and allocation of budget.

These organizations were also briefed periodically on the progress of the program. The fact that funded programs cover a wide geographic area, a variety of commodities and range across the spectrum of corporate size, has been well received by the industry.

Figure 6. 1986 Prospector's Assistance Program (● = location of assisted prospecting programs).

Funding requests for many programs of merit had to be declined due to the limit on available funds. It would have required a budget in excess of $14 million to have funded all meritorious programs in accordance with the program guidelines.

COMPONENTS OF THE 'FAME' PROGRAM

PROSPECTORS ASSISTANCE PROGRAM

This program is designed to assist individual prospectors with grants to a maximum of $5000.

Applications Received - 454
Applications Approved - 75
Budget Commitment - $200 000

Criteria used in evaluating the applicants under this program were:

Quality of program (50%)
Competence of applicant (20%)
Experience of applicant (15%)
Financial commitment of applicant (15%)

Grants approved ranged from $2000 to $5000 and averaged $2700. The approved projects were concentrated in active exploration areas and areas of good infrastructure (Figure 6). The targets ranged from precious metals through base metals to industrial minerals.

An advance of 50 per cent is paid to the prospector on approval of the program; the balance is paid on completion, subject to receipt of a satisfactory technical report.

MINERAL EXPLORATION INCENTIVE PROGRAM

This program is intended to assist companies explore properties that have an identified mining potential. Grants cover one-third of project costs, up to a maximum of $150 000. No company will be eligible for more than $300 000 for all projects submitted.

Applications Received - 256
Applications Approved - 61
Budget Commitment - $3.1 million

Criteria used in evaluating the applicants under this program were:

Stage reached in exploration process (30%)
Need for funding (20%)
Competence of applicant (20%)
Target commodity (10%)
Financial commitment (10%)
Infrastructure of project area (10%)

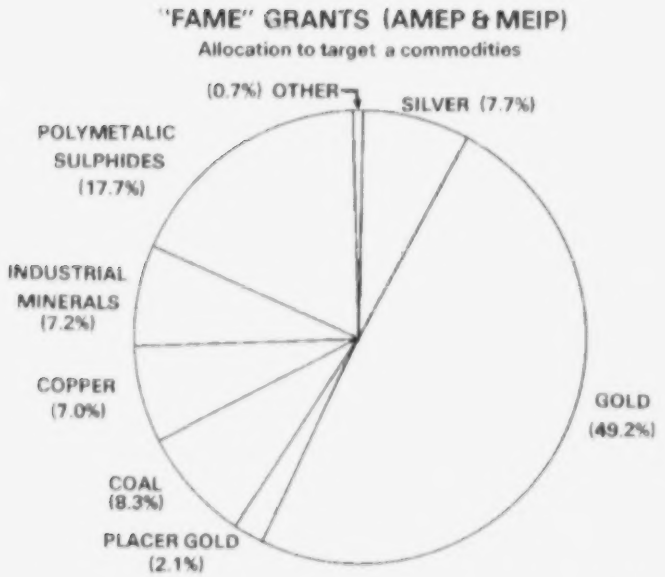

Figure 7. Allocation of funding, by commodity sought, under the Mineral Exploration Incentive and Accelerated Mineral Exploration Programs.

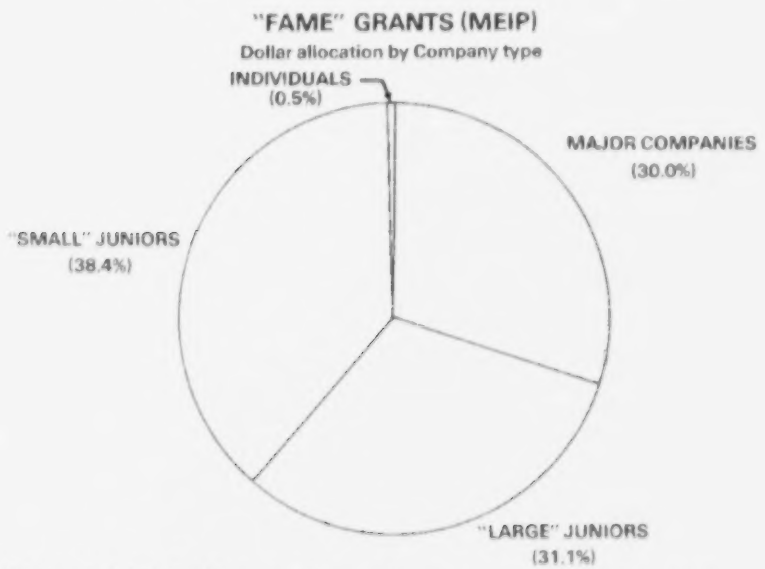

Figure 8. Distribution of dollar value of grants under the Mineral Exploration Incentive Program between different types of company.

Grants approved range from $2000 to $100 000 and average $51 410. The funded projects are exploring for precious metals (gold, silver, platinum), base metals (copper, lead, zinc), industrial minerals, rare earth minerals, and coal (Figure 7); most projects are at an advanced stage in the exploration process. A range of major and junior companies received funding (Figure 8). The geographic spread of exploration projects extends from the U.S. border to the extreme northwest of the province (Figure 9).

The total budgets associated with the funded programs were set at $29 853 400. The 'FAME' grants amount to a 10.7 per cent rate of financial assistance to these programs.

Payment of the grant is contingent on satisfactory completion of the program and submission of adequate technical reports.

ACCELERATED MINE EXPLORATION PROGRAM

This program is designed to assist operating or recently closed mines to increase their reserve base and extend their operating life. Grants cover one-third of eligible exploration costs up to a maximum of $300 000. Underground development costs are only 'eligible expenses' to the extent of 25 per cent of their total cost.

Applications Received - 31
Applications Approved - 19
Budget Commitment - $1.6 million

Grants approved range from $10 000 to $175 000 and average $82 368. The mines supported include coal, placer gold, industrial minerals, base metal and gold-mining operations.

Payment of the grant is again contingent on satisfactory completion of the project and submission of an adequate technical report.

RESULTS TO DATE

A data summary sheet is maintained for each project which monitors both technical progress and rate of expenditures. Start-up on many programs was delayed due to both forest fire hazard conditions in the bush and late commitment of funding from flow-through-share equity offerings; however, initial feedback is positive.

Few reports have yet been received on the prospectors assistance program; however, some grantees have made sufficiently encouraging finds to be able to option their properties to companies for further exploration.

- Among the operating mines supported, seven have succeeded in outlining sufficient additional reserves to extend the life of their operations.

Figure 9. Geographic distribution of funded projects under the Mineral Exploration Incentive and Accelerated Mine Exploration Programs (● = location of assisted MEIP program; ★ = location of assisted AMEP program).

- Production feasibility is under serious consideration on eleven projects supported by the Mineral Exploration Incentive Program.

- An additional seven companies are sufficiently encouraged that they will expand their programs significantly in 1987.

These developments will have a positive impact on the British Columbia economy.

Figure 10. Location of government field projects, 1986.

FIELD ACTIVITIES BY THE GEOLOGICAL SURVEY BRANCH IN 1986

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INTRODUCTION

The acceleration of field activities by Branch geologists in 1986 is directly attributable to increased funding from the Canada/British Columbia Mineral Development Agreement (MDA). The additional funds enabled the Branch to hire contract geologists to begin a systematic program of geological mapping on 1:50 000 scale; to increase the scope of more detailed studies in metal mining camps and coal districts; and to initiate projects to evaluate industrial mineral resources. The locations of current field programs are shown in Figure 10. Grants were also made to support university research on thesis topics with economic themes. Preliminary results of work carried out during the 1986 season are published in Fieldwork and Current Research, Geological Survey Branch Paper 1987-1 and presented in a series of Open File maps.

MINERAL DEPOSIT STUDIES

In the Mineral Deposits and Regional Mapping Section (formerly Project Geology) most projects are now related to exploration for precious metals. In southeastern British Columbia, contract geologist Ginette Carter, working under the direction of Trygve Hoy, carried out 1:50 000 mapping in the Skookumchuk map sheet to complete field work on the Purcell Supergroup project. The area has lead-zinc-silver and red bed copper potential. Trygve also continued work on the Mount Grace carbonatite near Revelstoke, and examined lead-zinc massive sulphide showings on Adams Plateau, a molybdenum-gold prospect in Rossland volcanic rocks south of Nelson and gold veins in the Ymir area.

Near Hedley, Gerry Ray and contract geologist Garnet Dawson completed 300 square kilometres of mapping at 1:20 000 scale in the roof pendant that hosts gold skarn deposits. The skarns are stratigraphically controlled and related to Mesozoic diorite sills and dykes; these intrusions are most common along a north-south axis that marks a pronounced facies boundary and may be related to pre-Triassic basement structures.

Neil Church began a mapping project in the Bralorne Gold Camp; most of map-sheet 92J/15W was completed at 1:50 000 scale and a stratigraphic section developed. This work further delineated the arsenic-antimony-mercury mineral zonation superimposed on the Paleozoic through Mesozoic stratigraphic section in the area.

In the Quesnel area, Andrejs Panteleyev is mapping the volcanic-plutonic axis of the Triassic island arc, and contract geologist Mary Ann Bloodgood is working on the basal black phyllite assemblage to

the east. A stratigraphic column has been established for the volcanic rocks and gold mineralization related to alkalic stocks examined; it is evident that mineralization is associated with large areas of low temperature hydrothermal alteration with associated quartz-carbonate veins that locally contain mercury. Considerable progress was made toward structural analysis and development of a stratigraphic column in the black phyllite succession.

Near Smithers, Don MacIntyre and contract geologists Derek Brown, Patrick Desjardins and Phyllis Mallett mapped about 900 square kilometres in the Dome Mountain area at 1:20 000 scale. All the major veins were mapped and sampled.

REGIONAL MAPPING

Contractors hired to carry out systematic 1:50 000 mapping over the life of the Mineral Development Agreement are Larry Diakow, Keith Glover, Nick Massey and JoAnne Nelson. Map-areas were selected following consultation with industry and Geological Survey of Canada geologists.

In the Taseko-Bridge River area, Keith Glover and contract geologists Paul Schiarizza, David Handel and Paul Rapp completed mapping the Warner Pass sheet(92O/3) and examined alteration zones and mineral showings within it. Major modifications will be needed to update previous mapping in this structurally and stratigraphically complex area. Most rocks previously assigned a Triassic age are Cretaceous; late Mesozoic to Tertiary intrusive rocks with associated hydrothermal alteration are more abundant than previously thought. This study documents critical field relationships that provide constraints on the geometry and timing of deformation along the eastern margin of the Coast Plutonic Complex. To the west, Graeme McLaren, with contract geologist Paul Vichert, continued mapping and silt sampling in the proposed Chilko Lake Park. Work this year extended coverage to the west of Chilko Lake and filled in the area between the Tchaikazan and Falls Rivers; several areas of promising alteration were examined and prospected. Silt sample data from the 1985 survey was published in June as Geological Branch Open File 1986-6; new geological and geochemical data will be published in early 1987, as it is compiled.

On Vancouver Island, mapping in the Cowichan Lake area by Nick Massey and contract geologists Steve Friday, Paulette Tercier and Jaqui Rublee covered most of sheet 93C/16. Facies variations, thrust faulting and younger intrusions hinder development of an understanding of Sicker Group stratigraphy. Units defined have been tentatively correlated with the stratigraphic units developed by Atholl Sutherland Brown in the Alberni area. However, in the Cowichan Lake area there is apparently a significant syn-Sicker erosional unconformity that may not be present to the north.

In central British Columbia, in the Whitesail Lake area, Larry Diakow and contract geologist Mitch Mihalynuk mapped 650 square kilometres of mountainous terrain. Cretaceous to Tertiary volcanic rocks

unconformably overlie Mid-Jurassic rocks. Pervasive argillic alteration, with local introduction of silica and barite, is developed along the unconformity close to Cretaceous-Tertiary intrusions. The altered zones have pronounced mercury and arsenic anomalies and carry pyrite. Arsenopyrite and some base metal sulphides and gold are reported in quartz veins adjacent to the intrusions, but also occur in veins distant from known intrusives.

In the Midway area, just south of the Yukon border, JoAnne Nelson, with contract geologists John Bradford and Kim Green, mapped 780 square kilometres and completed work on sheet 1040/16 which covers the Midway silver-zinc-lead manto deposit. The area is structurally complex; major Jurassic thrusts and late Cretaceous to Eocene wrench faults have been recognized. The contact between the McDame limestone and overlying black clastics of the Earn Group is locally faulted and eroded; there is evidence of several episodes of karsting.

DISTRICT GEOLOGICAL STUDIES

In the new Branch organization, a separate Coal Subsection has been created within District Geology and Coal Resources Section (formerly Applied Geology). In the northeast coalfield Ward Kilby and contract geologist Bruce Wrightson used computer-based techniques to compile existing data and mapped an area of 1450 square kilometres. Two Open File map sheets (93P/3 and 93P/4) which cover the Quintette and Bullmoose mining areas will be published in 1987. The computer database will be used to develop automated structural analysis techniques.

Andrew Legun completed work on the Carbon Creek 1:50 000 map sheet. To the south Andrew commenced a stratigraphic study of the coal-bearing Chamberlain Member of the Gething Formation which contains coal with significant economic potential.

District Geologists David Lefebure and Paul Wilton carried out MDA-funded projects in addition to their usual duties. David examined a number of gold deposits in the northwestern part of the province to develop a better understanding of their geological setting, particularly the structural controls and the alteration associated with mineralization. Among others he examined the Sulphurets, Banks Island, Dome Mountain, Golden Bear, Mount Johnny, Surf Inlet and Mount Henry Clay deposits, and properties in the Cassiar and Toodoggone camps. Paul continued his studies of the metallogeny of Vancouver Island and the Queen Charlotte Islands, with emphasis on the nature and distribution of precious metal deposits of suspected Tertiary age. The gold deposits at Mount Washington were studied in greater detail, and preliminary visits were made to deposits on Texada Island and to the Cinola and other prospects on the Queen Charlotte Islands.

District Geologist George Addie mapped the Millie Mac deposit east of Burton, where a klippe of sedimentary rocks is thrust over a package of intermediate to mafic volcanic rocks. Boulder-sized fragments

of quartz vein material, with silver and gold values, occur in the basal fault gouge. George also examined the Goldfinch, Wagner and Abbott deposits.

The Branch opened an office in Robson Square in Vancouver this summer. It is staffed by Senior Regional Geologist Tom Schroeter, formerly District Geologist in Smithers. Tom continued his study of gold deposits in the province, concentrating on those in the southern region. Brief visits were made to the Abo property near Harrison Lake, Blackdome mine, Tillicum Mountain, the Willa property near Silverton, and the Bralorne-Bridge River, Hedley and Greenwood-Grand Forks mining camps. In the north, he visited the Toodoggone camp and the Golden Bear(Muddy Lake) property. A tabulation of all gold occurrences in British Columbia, compiled by Tom Schroeter and Andrejs Panteleyev was published in September (Preliminary Map 64).

INDUSTRIAL MINERALS STUDIES

Industrial mineral field studies also increased significantly. Gary White completed an evaluation of marble and granitic dimension stone quarries, and the foundry sand potential of olivine from the Tulameen Complex. Contract geologist Jennifer Pell completed the field component of an analysis of the resource potential of carbonatites and kimberlitic diatremes along the Rocky Mountain trend. Contract geologist Steve Butrenchuk evaluated the phosphate potential of the Fernie and Ishbel beds in the Rocky Mountains. The Industrial mineral potential of Tertiary basins in southern British Columbia is being studied by contract geologist Peter Read. This project will evaluate volcanosedimentary deposits for ceramic clay, fireclay, bentonite and industrial zeolite potential.

GEOCHEMICAL STUDIES

The Branch also hired a contract geochemist, Paul Matysek, under the MDA program. Paul has acted as a consultant for the Regional Geochemical Survey and, with contract geologist Don Saxby, carried out a study comparing the reliability of conventional stream sediment and heavy mineral sampling for various sizes of gold particles. Data from all previous geochemical surveys have been standardized and made available on floppy diskettes in a format that can be handled by standard microcomputer software packages and are now more readily accessible to the exploration community.

Regional geochemical stream silt and water sampling, supplemented by lake sediment sampling where necessary, was carried out under the supervision of the Branch's Chief Chemist Wes Johnson and contractor Sam Zastavnikovitch. Coverage of two map-sheets, 93E and 93L, was completed; results will be released in Victoria, Vancouver and Smithers early next summer. The program was jointly funded by the Ministry and the MDA program; the Geological Survey of Canada pays the cost of analysing samples collected from one of the sheets. The areas sampled were selected in part to complement projects being conducted in the Whitesail and Dome Mountain areas.

UNIVERSITY GRANTS

Grants to support university research concerned with topics of economic interest were made to The University of British Columbia, and to Ken McClay of the University of London. Ken and his associates completed 1:50 000 mapping and detailed structural, stratigraphic and sedimentological studies of the Driftpile Creek area in northeastern British Columbia. Grants to U.B.C. were used to support eight projects supervised by Colin Godwin, John Ross, Glen Rouse, Kay Fletcher and Hugh Greenwood. Craig Leitch is studying the Bralorne-Pioneer gold vein by logging core, petrography, isotopic dating, and lead isotope and fluid inclusion analyses. Doug Reddy is attempting to delineate stratigraphy in the Indian River area and compare it to that in the Britannia pendant. Most of his work has been on the Hopkins property where he has mapped stratiform and stringer mineralization in hornfels. In central British Columbia, Kathryn Andrew is studying the Capoose low-grade silver deposit. In the north, John Bradford is studying the Midway silver-lead-zinc manto deposit. He mapped the property on a scale of 1:10 000 and plans analytical work that bears on the genesis of the deposit. In the northeast, Urs Mäder completed a thesis on the geological setting and genesis of the Aley carbonatite; this work has now been extended and will be the basis of his doctorate program. In the Northeast Coalfield, Jane Broatch established good palynozonation for two sections in rocks from the Minnes to the Gething Formations south of Burnt River.

Geochemical research by S. Day and K. Fletcher examined seasonal and hydraulic variations in the gold content of stream sediments in Harris Creek near Vernon. Large samples were collected and split into various size fractions; minus 270 mesh material gave the lowest variability between sites and between erosional and depositional regimes. The Branch, through the MDA program, also supported preparation of a computer database of volcanic rock analyses (LITHCHEM) and a library of galena lead isotopic analyses.